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THE
AMERICAN
JOURNAL OF PHARMACY.

PUBLISHED BY AUTHORITY OF THE
PHILADELPHIA COLLEGE OF PHARMACY.

EDITED BY
JOHN M. MAISCH.

PUBLISHING COMMITTEE FOR 1888:
HENRY N. BITTENHOUSE, CHARLES BULLOCK,
JAMES T. SHINN, THOMAS S. WIEGAND
AND THE EDITOR.

VOLUME LX.
FOURTH SERIES, VOLUME XVIII.

PHILADELPHIA:
1888.

1888, Jan. 16 - Dec. 11.

Gift of
the Publishers.

~~Transferred to Harvard Med. School~~

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Price, \$3.00 per Annum,
in advance.{ Issued in Monthly numbers of
not less than 48 pages.Single No. } Fourth Series. JANUARY, 1888. Vol. XVIII., No. 1
30 cts.

CONTENTS.

On the Analysis of Bitter Wine of Iron. By Herman J. M. Schroeter	1	The Antiseptic Action of Hops. By Dr. Hayduck	25
Extractum Asari Fluidum; Fluid Extract of Wild Ginger. By F. P. Streep	6	Urinary Pigments. By L. v. Udranszky	28
Extractum Cimicifugæ Fluidum; Fluid Ex- tract of Cimicifuga. By Edwin C. Leshner	7	Aldehyde Resin. By E. Puchot	29
Practical Notes in Pharmacy. Abstracts from Theses	9	Chloractones. By C. Colez	31
Abstracts from French Journals	12	Contributions to the Knowledge of the Coca Bases. By O. Hesse	41
Preliminary Note on Tincture of Quillaja Saponaria. By Peter Boa	15	Australian Opium. By W. E. Matthews	45
Dispensing Memoranda. By F. V. Butter- field	18	Recent Researches in Botany. By E. G. Baker, F.L.S.	46
Action of Acids on Zinc Containing Lead. By W. Spring and E. Van Aubel	20	Ustilago Maydis. By W. A. N. Dorland, M. D.	51
		Minutes of the Pharmaceutical College	58
		Junior Class List	55
		Senior Class List	60

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This journal is devoted to the advancement of PHARMACEUTICAL KNOWLEDGE and to the advocacy of a MORE THOROUGH EDUCATION and PRACTICAL TRAINING for all persons engaged in PREPARING and DISPENSING medicines, drugs and chemicals.

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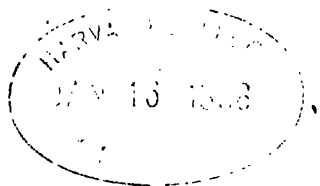
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5-473



THE AMERICAN JOURNAL OF PHARMACY.

JANUARY, 1888.

ON THE ANALYSIS OF BITTER WINE OF IRON.

A Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

BY HERMAN J. M. SCHROETER.

Read at the Pharmaceutical Meeting, December 20, 1887.

In discussing this subject it is the object of the writer to show by analysis the differences which exist between commercial and officinal bitter wine of iron, and at the same time propose a method for its assay.

It was thought desirable to have a standard for comparison, therefore a sample was made according to the formula of the U. S. P. 1880.

In order to be sure of the most important ingredient—the solution of citrate of iron and quinine—the manufacture of it was started by preparing from chemically pure ferrous sulphate the solution of tersulphate of iron, which was converted into ferric hydrate and used for preparing the solution of citrate of iron and ammonium, from which was obtained the salt in transparent garnet red scales. From this, then, the solution of citrate of iron and quinine was prepared. The white wine used, in preparing the stronger white wine, had the specific gravity of 1.027 at 20° C., and an alcohol strength by weight of 15.25 per cent.

To compare with the officinally prepared bitter wine of iron five samples were procured in the market from different sources. For aid

in reference to the different samples I will designate that prepared by myself No. 1., and the consecutive numerals to 6 for those investigated.

Physical properties.—The officinal product could be described in regard to physical properties as follows: a greenish-yellow-brown syrupy liquid, having an agreeable orange and vinous odor, a bitter and mild ferruginous taste, a slightly acid reaction, and the specific gravity from 1.110 to 1.120.

In physical properties, compared with No. 1, the other samples shared quite a range of differences. No. 2 alone showed the peculiar greenish color, which is due to the solution of citrate of iron and quinine. In the other the color varied from light to dark reddish-brown. But one sample, No. 5, possessed the bitter taste equal to No. 1. Nos. 2, 3 and 4 were not quite so bitter, and No. 6 was almost destitute of bitterness. The specific gravities varied from 1.041 to 1.091 at 20° C.

Determination of alcohol.—The method used was that recommended by the pharmacopœia for white wine. The percentage in No. 1 was found to be 20.5 by weight. Nos. 2, 3 and 5 showed respectively 15.75 per cent., 14.27 per cent. and 13 per cent.; Nos. 4 and 6 somewhat lower, 9.57 per cent. and 9.36 per cent.

Dry residue, ash and iron.—The dry extract was obtained by evaporating 20 gm. at a temperature of 100° to 110° C., until no further loss of weight occurred, and was found to be 13.25 per cent. in No. 1, and varying from 5.65 per cent. to 11.20 per cent. in the others. The ash was obtained by ignition at a red heat until a fixed weight remained. The color varied from light-gray in No. 2, to red-brown in No. 1, and the amount from 0.7 per cent. in No. 1, to 2 per cent. in one of the others. From this ash the iron was estimated by dissolving in hydrochloric acid, evaporating excess of acid and precipitating with ammonium hydrate, washing thoroughly with hot water, igniting and weighing as ferric oxide. No. 1 showed the highest, 0.5 per cent., the lowest being 0.225 per cent.

Estimation of quinine.—In assaying the amount of quinine present, the following method of extracting the alkaloid was resorted to: 20 gm. of the bitter wine of iron were placed in a glass separator; to this was added an aqueous solution of 0.1 gm. of tartaric acid and then solution of soda in slight excess. This was then agitated with four successive portions of chloroform, each of 10 c.c. After separa-

ting the chloroformic layers and mixing them, they were evaporated in a tared beaker on a water-bath, and the residue dried at a temperature of 100° C. From the weight of the residue the percentage of the alkaloid was calculated. The residue from No. 1 weighed 0.096 gm., equal to 0.48 per cent. of quinine present. The results obtained from the other samples proved but two of them to contain the official article. These two, Nos. 4 and 5, were assayed with a result of 0.125 per cent. and 0.45 per cent. of quinine. No. 4, therefore, being only of $\frac{1}{4}$ the official percentage, and No. 5 lacking but 0.03 per cent. The solutions of these alkaloids in water acidulated with dilute sulphuric acid, had a vivid blue fluorescence and responded to the following tests and reactions for quinine:

1. To a portion of the solution fresh chlorine water was added, and then NH_4OH in slight excess, when a green color was produced due to thalleioquin.

2. To another portion chlorine water was added, then a few drops of $\text{K}_4\text{Fe}(\text{CN})_6$, and finally a few drops of NH_4OH , a red color was produced, which rapidly faded.

3. KOH added to another portion formed a white precipitate, insoluble in an excess. NH_4OH also produced a white precipitate, soluble in an excess.

The residues from Nos. 2 and 3 for alkaloid were found to represent respectively 0.4 per cent. and 0.225 per cent., the former therefore within 0.08 per cent., the latter less than $\frac{1}{2}$ the official percentage. The above mentioned tests for quinine were applied to acidulated aqueous solutions of the suspected alkaloids, but with negative results in both cases; these acid solutions also having but an exceedingly faint fluorescence. The following tests for cinchonidine were then applied to these two solutions, and with positive results:

1. On adding NH_4OH to some of the solution a white precipitate was formed, which was almost insoluble in an excess.

2. To another portion of the solution $\text{KNaC}_4\text{H}_4\text{O}_6$ was added in slight excess and allowed to stand a short time; to the filtrate was added a drop of NH_4OH . Not more than a slight turbidity resulted, showing the absence of more than traces of the other cinchona alkaloids.

The residue from No. 6 showed only 0.05 per cent., about 1-10 the percentage of No. 1.

The above mentioned tests for quinine and cinchonidine, also other

cinchona alkaloid reactions, were applied to an aqueous solution of this residue, but with negative results. This solution was neither precipitated by tannic or picric acid, nor potassio-mercuric iodide, indicating the absence of most alkaloids. It is believed that sample No. 6 does not contain any trace of the cinchona alkaloids, nor any other active organic ingredient. Several tests for morphine were applied to the alkaloidal residues obtained from the samples, but all with negative results.

Determination of citric and tartaric acids.—The presence or absence of citric acid in the samples was also ascertained by recognized methods. The officinal article contains citric acid alone, as used in preparing the solution of citrate of iron, and also again in the solution of citrate of iron and quinine. Nos. 3 and 4 showed the presence of citric acid alone. No. 2 gave, with the tartaric acid tests, very decided results; this also showed a very small trace of citric acid present. Nos. 5 and 6 could be made to respond to tartaric acid tests alone, and proved the total absence of citric acid. It was suggested that the tartaric acid tests were responded to, due to the probable existence of traces of this acid present in the wine, which was used in preparing the bitter wine of iron. But this seemed impossible according to the results gotten. The amount of liquid used was small, and the results obtained were so decided to suggest more than such traces. The following test for citric acid was used:

To a portion of the liquid KOH solution was added and boiled; the precipitate, consisting of the hydrated iron, was filtered out. To the cooled filtrate was added test-solution of calcium chloride and allowed to stand some time, then filtered. The new filtrate, when heated to boiling, afforded a white precipitate, due to citrates.

The following tests for tartaric acid were used:

(1.) To a portion of the liquid was added test-solution of nitrate of silver, and then a few drops of NH_4OH ; on boiling, a mirror of metallic silver was formed on the test tube.

(2.) Another portion of the liquid was deprived of its iron by boiling with KOH solution; the cooled filtrate was then supersaturated with acetic acid, and yielded a white crystalline precipitate due to tartrates.

The percentage of sugar in each sample was not estimated.

Below will be found a table showing the results gotten from each sample as described above:

	U.S.P., No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.
Color.	greenish, yellow- brown.	very dark greenish- brown.	dark red- dish-brown	reddish- brown.	light red- dish-brown.	reddish- brown.
Taste.	very bitter.	bitter.	medium bitter.	medium bitter.	bitter.	not bitter.
Sp. gr. at 20° C.	1.114	1.062	1.049	1.041	1.061	1.044
Per cent. of alcohol by weight.	20.5 p. c.	15.75 p. c.	14.27 p. c.	9.57 p. c.	13. p. c.	9.36 p. c.
Fixed residue.	13.25 "	10.15 "	10.30 "	8.075 "	11.20 "	5.65 "
Ash.	0.70 "	1.80 "	1.41 "	1.475 "	2.00 "	1.40 "
Fe ₂ O ₃ .	0.50 "	0.42 "	0.475 "	0.35 "	0.48 "	0.225 "
Alkaloid.	quinine. 0.48 p. c.	cinchon- dine. 0.40 p. c.	cinchon- dine. 0.225 p. c.	quinine. 0.125 p. c.	quinine. 0.45 p. c.	undeter- mined. 0.05 p. c.
Citric or Tartaric acid.	citric acid.	tartaric, trace of citric acid.	citric acid.	citric acid.	tartaric acid	tartaric acid

As no method for assaying this preparation is offered by the Pharmacopœia, it occurs to the writer that the following directions might aid in its examination :

Note physical properties, which should not be far from those described above, with a specific gravity of 1.110 to 1.120. Estimate alcohol by the method given, the amount by weight should not be far from 20 per cent. Determine dry extract by evaporation on a water-bath to constant weight, ignite this and determine percentage of ash ; from which estimate the iron. Treat 20 gm. of the solution of bitter wine of iron with 0.100 gm. of tartaric acid, add sodium hydrate in slight excess, agitate with four successive portions of chloroform, mix these four chloroformic extractions, evaporate to constant weight, and weigh ; the yield should be 0.48 per cent. Determine the identity of this alkaloidal residue. Finally apply tests for citric and tartaric acids, those for the former acid in a complex mixture can only be of a confirmatory character, but those for the latter one are more positive ; for, when the silver mirror is obtained, there is little room left for doubt.

Sodium borate, to which the absurd name "antifungine" has been applied, is recommended in solution (fifteen per cent.) in the treatment of diphtheria. It is applied locally by the spray or with a soft brush, and is also to be taken internally in doses of from five to twenty minims.—*Quart. Therap. Rev.*

EXTRACTUM ASARI FLUIDUM; FLUID EXTRACT OF WILD GINGER.

Contribution from the Pharmaceutical Laboratory, Philadelphia College of Pharmacy.

By F. P. STREEPER.

Read at the Pharmaceutical Meeting, December 20, 1887.

Having undertaken a series of experiments to determine a menstruum which would most effectively exhaust asarum, and hold in solution the volatile oil and resin to which the medicinal properties are probably due, three fluid extracts were made of different alcoholic strengths and numbered Nos. 1, 2, and 3.

No. 1.—150 grammes of ground asarum was moistened with 95 per cent. alcohol, and tightly packed in a conical percolator, a sufficient quantity of the requisite menstruum was then added to thoroughly saturate the drug and leave a stratum above it; when the liquid commenced to drop from the percolator, the lower orifice was closed, and having closely covered the percolator, maceration was allowed to proceed for forty-eight hours. Percolation was then commenced, gradually adding alcohol until the drug was thoroughly exhausted, the first 135 c.c. of the percolate was reserved, the remainder evaporated, by means of a still, to a soft extract, and the alcohol collected. The soft extract was dissolved in the reserved portion, and enough alcohol added to make the fluid extract measure 150 c.c.

This furnished a perfectly transparent liquid of a rich, amber color, with an agreeable, aromatic, strongly persistent odor, and pungent, warm and lasting taste, and showed no indications of precipitating after standing for several weeks, and beyond a doubt holds in solution the active principles of the drug.

No. 2.—150 grammes of the ground drug was taken as before, macerated and percolated, using, however, a menstruum consisting of three parts of alcohol and one part of water, corresponding to 71½ per cent. of absolute alcohol; the operation was conducted in precisely the same manner as the preceeding. This furnished a darker fluid extract than No. 1, no doubt due to the more aqueous menstruum dissolving more of the coloring matter, but the soft extract obtained by distilling and evaporating the percolate was mostly insoluble in the reserved portion, and deposited as an oily, resinous precipitate. This fluid extract on standing for several weeks deposited yellowish-white

stellate crystals, which were not further examined. These crystals were not noticed in either one of the other two fluid extracts.

No. 3.—150 grammes of the ground drug was taken, as in each of the preceding cases, and exhausted, using a menstruum consisting of two parts of alcohol and one part of water, corresponding to 63½ per cent. of absolute alcohol, the most aqueous menstruum used. This finished fluid extract is darker than either of the preceding ones, showing that the coloring matter is dissolved principally by the water, and as in the case of No. 2, it precipitated most of the volatile oil and resin, which had been extracted by the alcohol, leaving in solution in the aqueous menstruum but a small portion of the active principles.

From the foregoing experiments it will be seen that in cases where a drug owes its activity to volatile oil and resin, and a large quantity of either is present, as is the case with asarum, a menstruum of 95 per cent. alcohol or nearly this strength is absolutely necessary, if it is desired to thoroughly exhaust the drug of these principles and retain them permanently in solution in the finished fluid extract.

EXTRACTUM CIMICIFUGÆ FLUIDUM; FLUID EXTRACT OF CIMICIFUGA.

Contribution from the Pharmaceutical Laboratory, Philadelphia College of Pharmacy.

BY EDWIN C. LESHER.

Read at the Pharmaceutical Meeting, December 20, 1887.

The investigation of the active principle of medicinal plants, and the determination of the menstruum for extracting the same, is a work attended with no little trouble. Having made a number of experiments to ascertain the best menstruum that would produce a fluid extract of cimicifuga, the following results are hereby recorded:

Formula No. 1: Cimicifuga in No. 60 powder, 8 ounces av.; alcohol sufficient to make 8 fluid-ounces. Moisten with 2 fluid-ounces of alcohol.

Formula No. 2: Cimicifuga in No. 60 powder, 8 ounces av.; diluted alcohol sufficient to make 8 fluid-ounces. Moisten with 2 fluid-ounces of diluted alcohol.

Formula No. 3: Cimicifuga in No. 60 powder, 8 ounces av.; alcohol, 2 parts; water, 1 part. Moisten with 2 fluid-ounces of the menstruum.

Formula No. 4: Cimicifuga in No. 60 powder, 8 ounces av.; alcohol, 3 parts; water, 1 part, sufficient to make 8 fluid-ounces. Moisten the powder with 2 fluid-ounces of the menstruum.

Pack firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and have a stratum above it; when the liquid begins to drop from the percolator, close the lower orifice and macerate for forty-eight hours. Then allow the percolation to proceed, adding menstruum until the cimicifuga powder is exhausted. Reserve the first six fluid-ounces, distil off the alcohol from the remainder, and evaporate the residue to a soft extract; dissolve this in the reserved portion and add enough menstruum to make eight fluid-ounces.

In making these experiments the alcohol was recovered by the use of the still, and after having ascertained its specific gravity, converted into diluted alcohol.

The making of fluid extracts is not a difficult operation in the hands of the practical pharmacist. It cannot be too strongly urged that a druggist should make his own fluid extracts. It is in these more especially, that manufacturing pharmacists have almost a monopoly, and will continue so to have as long as the drugman is disinclined to help and work for his own individual interest. The making of these give him, 1st, confidence in his own ability; 2d, practical knowledge which he cannot know or remember as well, simply from books; 3rd, assurance that his extracts are not only what he represents them to be, but that none are better, if any are as good; 4th, respect and confidence from the physician, who must needs feel that such a druggist is progressive, and trying to keep up the advance of pharmacy.

On examination of the different residues it was found that the one in which three parts of alcohol and one of water, as the menstruum, was used was entirely exhausted; the extract was of a very good quality, if not superior to the one in which alcohol was used as the menstruum.

Poisoning with Iodol.—Pallin gives an account of a case of necrosis of the clavicle in which an operation was performed, and seventy-five grains of iodol were applied to the wound. During the evening of the same day the patient became delirious, and on the following day his temperature was 102.2° F., his pulse was 136, small and irregular, and he vomited and was apathetic. The urine showed traces of albumen and a weak iodine reaction. Although the dressing was changed at once, all the iodol being washed out of the wound and bismuth applied in its place, the symptoms of poisoning lasted four days longer, and for a fortnight iodine was to be recognized in the urine.—*N. Y. Med. Jour.*

PRACTICAL NOTES IN PHARMACY.

Abstracts from Theses.

Mucilago Acaciæ.—With the view of rendering the mucilage of gum-arabic permanent, George P. Ringler, Ph. G., suggests to prepare it by dissolving 4 ounces of the gum in a mixture of 4 ounces each of glycerin and water. The solution is effected in the usual way by maceration and agitation, and usually requires straining to free it from accidental impurities. It is particularly well adapted for the preparation of

Syrupus Acaciæ, by mixing 3 parts of the mucilage with 5 parts of simple syrup. The syrup should be prepared extemporaneously, since it will not keep long in warm weather without spoiling.

To ascertain the preservative influence of glycerin upon the solution of gum, the mucilage prepared according to the Pharmacopœia, and several samples containing glycerin were simultaneously exposed to a temperature varying between 65° and 80° F., and it was found that the former would keep for about one week; while a menstruum composed of 28 water and 16 glycerin would render the mucilage serviceable for two weeks; a mixture of 24 water and 10 glycerin for five weeks, and a mixture of 20 water and 15 glycerin for more than seven weeks.

Tinctura Vanilla.—While retaining the pharmacopœial percentage of vanilla in this preparation, John K. Faust proposes changes in the menstruum and in the manipulation. Instead of using sugar for beating the vanilla into powder, he suggests the use of washed sand for this purpose, but in much larger proportion than has been employed by Mr. Chas. Shivers (AM. JOUR. PHARM., 1861, p. 383). The menstruum contains glycerin, the alcoholic strength is reduced, and maceration in the percolator, for a short time, is resorted to. Cut vanilla, 10 parts, is beaten into a uniform powder with washed sand, 75 parts, the mixture packed into a percolator, and macerated for four hours with sufficient menstruum composed of alcohol 50 parts, glycerin 19 parts and water 31 parts; percolation is then allowed to proceed until 100 parts of tincture have been obtained.

Syrupus Sarsaparillæ Compositus.—In 1878 Mr. Isaac Davis proposed (AM. JOUR. PHARM., 1878, p. 327) the preparation of this and other syrups by percolating the drugs, suitably powdered, with simple syrup. Irvin J. Brandt, Ph. G., now suggests a modification of this

process, by combining the process of dissolving the sugar with that of exhausting the powdered drugs. For the syrup named he proposes the following manipulation: Reduce to a number 20 powder the following drugs: sarsaparilla, $12\frac{1}{2}$ ounces, avoirdupois; guaiacum, $1\frac{1}{2}$ ounces; pale rose, 1 ounce; glycyrrhiza, 1 ounce; senna, 1 ounce; sassafras, $\frac{1}{2}$ ounce; anise, $\frac{1}{2}$ ounce, and gaultheria, $\frac{1}{2}$ ounce. Moisten the powder with a menstruum composed of 1 part of alcohol and 7 parts of water; when thoroughly saturated transfer to a percolator, pack firmly, cover with a piece of filtering paper; upon this place 50 ounces of sugar, and gradually add more menstruum until the percolate begins to drop; then close the lower orifice, macerate for forty-eight hours, and finally percolate until $3\frac{1}{2}$ pints of syrup are obtained.

Syrupus Scillæ Compositus was made by the same process and with equally good results, a small quantity of ammonia having been added to the menstruum with the view of holding the pectinaceous principle of senega in solution.

Commercial Lard.—Norman G. Ritter, Ph. G., prepared lard according to the Pharmacopœia from the internal fat, the leaves, the loss from the weight of the crude fat being 7.5 per cent. Comparing it (No. 1 of the table below) with a number of commercial samples; the following results were obtained. The process of analysis is not given:

NO.	MELTING AT	CLEAR AT	WATER PRESENT.	SALTS PRESENT.
1	88° F.	95° F.	—	traces KCl and NaCl.
2	86° F.	93° F.	9.5 per cent	0.75 per cent. KCl, NaCl.
3	86° F.	93° F.	—	traces of chlorides.
4	82° F.	92° F.	.2 per cent.	0.75 per cent. chlorides and carbonates.
5	86° F.	93° F.	1.75 per cent.	0.5 per cent. chlorides.
6	86° F.	93° F.	2.0 per cent.	0.5 per cent. chlorides.
7	86° F.	93° F.	3.0 per cent.	0.5 per cent. carbonates.
8	82° F.	92° F.	4.5 per cent.	traces of chlorides.
9	82° F.	92° F.	—	0.5 pr. ct. chlorides with trace of alum.
10	82° F.	92° F.	0.5 per cent.	0.5 per cent. carbonates.
11	82° F.	92° F.	7.0 per cent.	0.5 percent. chlorides.

Aside from the water and salts found in most, the commercial specimens consisted either entirely of the external fat, or of mixtures of the internal and external fat, as indicated by their melting points. The cost of the lard, rendered by the author, was from 10 to 16 per cent. less than that of the samples examined.

Unguentum Hydrargyri.—Wm. M. C. Craine, Ph. G. examined a number of specimens of mercurial ointment obtained from pharmacists and from manufacturers, with the view of determining the amount

of mercury oxides present. The ointment was digested with benzin to remove fat, and the residue treated with alcohol to dissolve resinous matters; the metallic residue was weighed, treated with dilute nitric acid and again weighed; the amount dissolved by the acid was noted as mercury oxide, no account being taken of the possible presence of other metals.

Ointments sold as containing 50 per cent. of Mercury.			Ointments sold as containing 33 1/3 per cent. of Mercury.		
NO.	MERCURY FOUND.	OXIDE FOUND.	NO.	MERCURY FOUND.	OXIDE FOUND.
1	48. per cent.	1.125 per cent.	1	29.6 per cent.	.75 per cent.
2	37.375 per cent.	.75 per cent.	2	33.25 per cent.	.85 per cent.
3	49.125 per cent.	2. per cent.	3	33.75 per cent.	.675 per cent.
4	49. per cent.	.875 per cent.	4	31.75 per cent.	.6875 per cent.
5	33.75 per cent.	.5 per cent.	5	26.5 per cent.	.5 per cent.
6	29.4 per cent.	trace per cent.	6	31. per cent.	.633 per cent.
7	42.5 per cent.	1.5 per cent.	7	32.125 per cent.	.84 per cent.
8	51.25 per cent.	1.6 per cent.	8	31. per cent.	.6 per cent.
Average	42.5 per cent.	1.044 per cent.	Average	31.122 per cent.	.692 per cent.

Commercial Petrolatum.—John G. Patton, Ph. G., examined a number of samples, as to color, melting point, solubility in 64 parts of boiling alcohol, treatment for two hours with sulphuric acid, specific gravity 1.54, and heating upon platinum foil. Each sample was also digested for half an hour with an equal weight of soda and five parts of water, the aqueous liquid being then supersaturated with dilute H_2SO_4 , to determine the presence of oily or resinous matters.

The results tabulated are as follows:—

Sample from	Color.	Begins to melt.	Melts at	Alcohol treatment	Effect of H_2SO_4	Vapors from Platinum foll.	Treatment with soda.
New York	yellow	28° C.	38° C.	insoluble.	considerably darkn'd	not acrid.	no oil.
Philadel.	amber.	37° C.	45° C.	insoluble.	slightly darker.	not acrid.	no oil.
phila.	yellow	39° C.	48° C.	insoluble.	much darker.	acrid.	trace of oil.
Bingham-	orange	39° C.	47° C.	insoluble.	slightly darker.	not acrid.	no oil.
ton.	red.	39° C.	39° C.	insoluble.	very slightly darker.	not acrid.	no oil.
Philadel-	orange	32° C.	40° C.	insoluble.	much darker.	acrid.	traces of oil.
phila.	yellow						
Cleveland	yellow						
	lowish						
	dark						
New York	orange						

Chloral hydrate is rabies.—Brown-Séquard report a series of experiments on rabbits and birds, in which he produced a kind of rabies by injecting oil of tansy. This rabies he was able to control by the vapor and subcutaneous injections of chloral. Brown-Séquard thinks that, from analogy, chloral is a preventive of true rabies.—*L'Union Méd.; Jour. Amer. Med. Assoc.*, Dec. 10, 1887.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the AMERICAN JOURNAL OF PHARMACY.

PICHI.—In an article on *Fabiana imbricata* (*Jour. de Phar. et de Ch.*, Nov. 1, 1887). Nivière and Liotard “conclude that pichi contains no alkaloid, and that its therapeutic action is due to a glucoside resembling æsculin.” As such investigations are often widely quoted, it is proper to state that Limousin suspected the presence of an alkaloid in fabiana; that its presence was indicated by Dr. Rusby in 1885; and that Dr. Lyons found less than 0.1 per cent. of this alkaloid. (See AM. JOUR. PHAR., 1886, p. 71. Dr. Lyons also showed the resemblance to æsculin of the fluorescent principle of fabiana.)

STROPHANTUS AND STROPHANTINE. At a meeting of the *Société de Phar.*, (Nov. 2), several members presented observations upon the therapeutic uses of the plant. It was found that the different species were very variable as to physiological activity, some of them being almost valueless. Mr. Wurtz remarked, concerning strophantin, that its present price—60 francs per drachm—prevented its use in therapeutics.

PILLS OF TERPINOL.—Tanret's formula is given as follows in *Nouv. Rem.* Dec. 8, 1887: terpinol and benzoate of sodium, $\bar{a}\bar{a}$ 1 gm.; sugar, q. s. Make 10 pills; dose 5 to 10 pills daily.

THERAPEUTICS OF TEREBINTHINA AND DERIVATIVES.—Dr. Dujardin Beaumetz places the substances thus, in the order of their value: for maladies of the bladder: oil of turpentine, terpin, terpinol; for maladies of the bronchia: terpinol, terpin, oil of turpentine. *Nouv. Rem.*, Dec. 8, 1887.

METHYLAL, according to a recent work by Mairé and Combe-malle, though without effect in alcoholic insanity and in the early stage of simple insanity, generally succeeds in the crises of the latter; in the insomnia of simple dementia; in atheromatous dementia, and in paralytic dementia. The doses necessary to induce sleep in these cases vary from 5 to 8 gm. In five or six days, patients become so habituated to it that the amount of sleep then diminishes, even if the dose be augmented. Intervals of two or three days should therefore elapse between each series of doses. The action of methylal is exclusively hypnotic; its use has never caused functional troubles of the great organs. It is so safe, so easily prepared and so agreeable to patients that it should have a place in hypnotic medication in mental alienism.

Rech. sur l'act. phys. de meth., Montpellier, 1887; *Le Prog. méd.*, October 29.

IODOFORM DEODORIZED.—In the *Bull. gén. de Thérap.*, November 15, 1887, Mr. Cantrelle, pharmacist, after remarking that all of the substances used for the purpose indicated have proved valueless, recommends the following: iodoform, 1 gm.; menthol, 5 cgm.; oil of lavender (fine), 1 drop. The writer states that in this mixture the odor of iodoform will remain masked as long as the dressing remains in use.

CHLORAL AND IODOFORM: THEIR ACTION UPON CERTAIN MERCURIC SALTS.—In a paper thus entitled (*Jour. de Ph. et de Ch.*, December 1, 1887), Mr. S. Cotton arrives at the following conclusions: 1. Chloral reduces the mercuric acetate with the liberation of carbonic acid and the formation of mercurous acetate. 2. Chloral reduces the mercuric nitrate and liberates carbonic acid, forming calomel. 3. Iodoform reduces the mercuric acetate with the disengagement of carbonic acid and the formation of mercurous acetate, precisely as with chloral. 4. Iodoform does not reduce the mercuric nitrate; its action is limited to the formation of the corresponding iodide. 5. Chloroform and bromoform do not act upon these salts.

HYDROCYANATE OF CHLORAL.—This preparation is proposed by Hermes to replace the uncertain mixtures known as aqua lauro-cerasi, aqua amygd. amar., and their analogues. The physiological action of hydrocyanate of chloral is thought by Pinner and Bischoff to be the same as that of pure hydrocyanic acid; the formula presented is $\text{CCl}^3\text{-CH} \begin{Bmatrix} \text{OH} \\ \text{CN} \end{Bmatrix}$. The aqueous solution gives pulverulent crystals forming in rhombs or prisms. It is readily soluble in water, alcohol and ether. With the vapor of water it volatilizes slightly, and decomposes into chloral and hydrocyanic acid. Alkalis also decompose it, with a reproduction of hydrocyanic acid. It is very stable. One part of anhydrous hydrocyanic acid is equal to 6.46 of hydrocyanate of chloral. To obtain a solution of equal activity to aq. dest. amygd. amar., 6 cgm. hydrocyanate of chloral is dissolved in 10 gm. of water.—*Ph. Cent., Arch. de Phar.*, Dec. 5, 1887.

REACTION OF COTTON-SEED OIL.—Treated with subacetate of lead and a caustic alkali, cotton-seed oil gives, almost immediately, an orange-red reaction. This, according to Mr. Labiche, a French pharmacist, is peculiar to this oil, for almond, castor, olive, poppy, rape

and cod-liver oils give a milky mixture, which is also the case with butter when thus treated. Mr. Labiche mixes equal parts of the oil and a saturated solution of neutral acetate of lead, and adds ammonia, stirring briskly. The acetate decomposes and the nascent oxide reacts upon the oil. Then the red color appears. After standing, the surface turns orange-red and the lower portion becomes grumous. If 20 per cent. of cotton-seed oil be present the coloration appears at once; lesser quantities show on the surface after the mixture has remained standing for a time.—*L'Union Ph.*, Nov., 1887.

CAPRIC ACID.—A new source of this acid has been found by A. and P. Buisine (*Acad. des Sci.*, Oct. 10), in the washings of wools. When these waters are slightly acidulated, a complex, fatty matter is separated, which is found mixed with fat acids in saponification with potash; and also neutral fatty principles are present, held in emulsion in the liquid. This fat is the first matter from which we extract capric acid; it gives about five per cent. But capric acid in quantity is not present in the fresh washings of wools; they must be old, *i. e.*, have undergone fermentation before much of the acid can be found. The authors state that this "augmentation is due to the action of microbes, for it is not found in sterilized waters." They say furthermore "that this formation of a fat acid by microbes is interesting, from the fact that up to this time we have had no knowledge concerning the mode of generation of fatty substances." *Moniteur Scientifique*, Nov. 1887.

DISTILLATION OF CITRIC ACID WITH GLYCERIN.—In a note to the *Acad. des Sci.*, Clermont and Chautard report as follows: "The formation of pyruvin as the unique product of the distillation of a mixture of citric acid and glycerin, is a curious and unexpected result. We know that pyruvin is obtained from the distillation of tartaric acid with glycerin, and it is difficult to understand how we get the same substance under the same conditions, from so different a compound as citric acid. Erhardt succeeded in preparing pyruvin by distilling glyceric acid with glycerin. It appears probable that in our operation the pyruvin originates in this way, and that the glyceric acid is formed in the course of the reaction at the expense of the glycerin or the acrolein. We could isolate no other product in our process. We sought carefully for the pyrocitric acids, but could find no trace. We were obliged to admit that the citric acid was entirely destroyed." *Moniteur Scientifique*, Nov. 1887.

SACCHARATED OXIDE OF IRON.—Traub, of Berlin, agrees with Hager, that this preparation represents a combination of ferric saccharate and sodic saccharate, in which the latter determines the solubility of the former. In presence of an excess of soda, a relatively smaller amount of sugar is needed to hold the ferric oxide; otherwise a large quantity is needed. The preparation is made by dissolving 100 gm perchloride of iron in 500 ccm. of water, into which is poured a solution of 85 gm. crystallized sodium carbonate in 500 ccm. of water. The precipitate is washed, pressed and mixed with 100 gm. powdered sugar, to which has been added, 1.50 gm. of caustic soda (in plaques) dissolved in 3 gm. of water. The mixture is then evaporated to dryness. The mass is now pulverized, the quantity of iron determined, and a q. s. of powdered sugar added. This saccharate is very soluble. The oxide precipitated by ammonia is not soluble with sugar and soda. *Bull. Com.*, Nov. 1887.

Hager recommended (*Commentar*, I, p. 723) 33 gm. solution of ferric chloride, sp. gr. 1.282 (containing 29 per cent. Fe_2Cl_6), and 27 gm. cryst. sodium carbonate; the washed and pressed precipitate is dissolved in water, 30 gm.; sugar, 10 gm.; and caustic soda solution (sp. gr. 1.162) 26 gm., the clear solution poured into alcohol, the precipitate dried and properly diluted with sugar.

PRELIMINARY NOTE ON TINCTURE OF QUILLAIA SAPONARIA.

BY PETER BOA.

Having had some experience in the use of quillaia bark for other than strictly medicinal purposes, I had long ago come to the conclusion that an aqueous menstruum was the most suitable for extracting its active constituents. I was therefore somewhat surprised to find that the formula given by the British Pharmaceutical Conference Committee directed the tincture to be made with rectified spirit. It is true that no dose is specified, and as the tincture for which the formula is given is used in the preparation of liquor picis carbonis we may reasonably assume that this was the sole object for which the tincture was designed, and if this be so we can scarcely find fault with it, because for the purpose in question a rectified spirit tincture would be preferable to one less strong in alcohol. However, there is

an increasing demand for tincture of quillaia for internal use; in Edinburgh this has been markedly so since the beginning of this year, when Dr. Claud Muirhead, in the *Edinburgh Medical Journal*, referred in commendatory terms to the administration of the drug in bronchitis, and there is just a possibility that the B.P.C. formula may be taken as a guide to the preparation of the tincture for this purpose. It would, I think, be a pity if it were so taken, because this tincture does not at all represent the virtues of the bark. I have looked up a number of references to quillaia, and I find that all the writers on the subject agree in the conclusion that water is the best solvent of saponin, which is regarded as the active principle of the bark. Gmelin says that saponin is easily soluble in water (1 in 4), more soluble in dilute than strong alcohol, insoluble in absolute alcohol.

Hager gives a formula of an infusion, and a tincture prepared with dilute alcohol.

Grazer, an American pharmacist, recommends for emulsifying purposes a tincture with 3 parts of water and 8 of rectified spirit.

Dr. Claud Muirhead has used with success a decoction.

Collier gives a formula (*Phar. Jour.*, Sep. 20, 1879, *Am. Jour. Phar.*, 1880, 41) for emulsifying purposes with 4 ounces of bark to a pint of rectified spirit; this apparently is the formula copied into the B.P.C. formulary, but made with only half the quantity of bark.

For the purposes of this note I have prepared tinctures of various alcoholic strengths. I take three of these for comparison:

No. 1 is made according to the B.P.C. formula.

No. 2 is made with proof spirit.

No. 3 is made with 3 of rectified spirit and 4 of water.

The time at my disposal since agreeing to bring the subject before this meeting has not been sufficient to enable me to estimate the comparative values of these tinctures except in a somewhat rough and ready way, although I believe the results may be taken to be fairly trustworthy. The quantity of saponin in a tincture may be estimated comparatively by the amount of froth which it produces when shaken up with a quantity of water. Taking the three tinctures above mentioned, adding one-half a drachm of each to two ounces of water in a six-ounce bottle, and shaking, the following results were observed:

No. 1 gave off froth 1.

No. 2 " " " 1½.

No. 3 " " " 2.

A percolate obtained by running a quantity of water, equal to half the quantity of the original tincture, through the marc from the B.P.C. formula, gave nearly as good results as No. 3, showing that the bark had not been exhausted by any means; a percolate obtained in the same way from the proof spirit tincture residue gave very little indication of value. I may say that preliminary mixtures with the water were made with spirit added to Nos. 2 and 3 to make them equal in alcoholic strength to No. 1, in case the spirit might affect the froth test. It was not found to affect the results and has not been added to the specimens shown to illustrate the comparative frothing power. An emulsion made with No. 1 and a fixed oil separated more quickly than one prepared with No. 3. I hope, if time will permit, to determine more accurately the comparative values of these tinctures. However, I have no hesitation in concluding from the result of my experiments that a weak alcohol is preferable to a strong for making tincture of quillaia. In fact I see no use for any alcohol except for preservative purposes.

The question arises: What should be the strength of the tincture? Dr. Muirhead says he gave ʒss to ʒj of tincture, but, unfortunately, he says nothing about the strength. He mentions, however, that the decoction of which he gave a tablespoonful was made with 5 of bark and 200 of water. A tincture of equivalent strength might therefore, be made with 2 ounces to a pint. To make the tincture approximate in strength to senega tincture, 1 ounce to the pint would be more than enough.

There is just one point more to which I would allude. The B.P.C. formulary does not specify the part of quillaia bark to be used. Undoubtedly the white portion of the bark is the more valuable; the brown outer portion contains chiefly coloring matter. Both, however, are used together, for I have seen commercial specimens of tincture resembling in color tincture of orange peel. The specimens shown, made from the white portion, are, at most, pale straw color. In making liquor picis carbonis color is of no consequence, and the quantity of bark ordered is greatly in excess of what the menstruum can exhaust, hence, presumably, the want of any specification on this point.—*Phar. Jour. and Trans.*, November 19, 1887, p. 426.

DISPENSING MEMORANDA.

By F. V. BUTTERFIELD.

With regard to its importance, dispensing may be considered the "soul" of the chemist's existence; take that away, and he at once degenerates, and descends to the level of the ordinary tradesman. This only serves to show how important it is that the pharmacist should cultivate the *scientific* portion of his business, and thus raise himself beyond the competition of ignorant hucksters and others, who seek to dabble in medicines. I trust the day is approaching when chemists, in general, will be looked upon as a body of public analysts, entrusted with the analyses of potable water, milk, wine, etc.; many of our leading pharmacists occupy this position at the present time.

It behooves us, then, to excel in this important branch of our business, known as the dispensing department, and make ourselves worthy of the confidence of the medical profession. But the question is, Are we doing this? If so, then why are physicians so frequently found to prescribe American pills and extracts and other proprietary pharmaceutical preparations, in preference to those of our own compounding, if ours are equal to them in elegance, and have the great advantage of being *freshly* and scientifically prepared. The "future of pharmacy" is engaging the attention of some of our leading men, and these proprietary preparations, multiplying as they are every day, must have a marked influence on it, certainly a bad one, in substituting *factory-made* mixtures, pills, etc., in place of pure and simple dispensing. Into what it will eventually evolutionize it is impossible to say, but the struggle must end in the "survival of the fittest."

Rule of thumb methods of manipulation, relics of the pharmacy of the past, are but too frequent in the dispensary of to-day, wasting valuable time and generally attended with unsatisfactory results. To take one example of a numerous class—a prescription to be dispensed reads thus:

R Strychninæ..... gr. j.
Excipientis..... q.s. ut fiant pilule sexaginta.

Now, this "excip. q.s." troubles the spirit of the man who pins his faith to "rule of thumb," whereas the efficient dispenser knows *by experiment* that it will require equal parts of confection (rosæ caninæ) and pulv. glycyrrhizæ to make a mass of a proper pilular consistence, and weighing out thirty grains each to form a one-grain pill, has

finished his batch, whilst the former is still trying various excipients, and when done makes them larger or smaller than necessary, and probably too soft.

Ext. cascar. sag. has now become very popular, and owing to its disagreeable taste is frequently prescribed in form of pill, which is often very refractory, it being a difficult matter to prevent them "falling." Pills sent out as hard as they could possibly be made have been too frequently returned *en masse*.

Having had the same difficulty, a few experiments were accordingly tried, and the following method is one which I have used almost daily for a good length of time, and never known to fail.

After trying various excipients, with little success, the softening of the pills and consequent "falling," could only be attributed to absorption of moisture, so, in order to prevent this, a coating of varnish was tried, and proved the supposition to be correct.

In dispensing pills containing *ext. cascar. sag.*, varnishing (or coating with gelatin, etc.) is, therefore, considered a *sine quâ non*.

The commercial extract is usually very soft, when fresh, and, if kept from damp and moisture, becomes harder on keeping, and much more difficult to manipulate. The best way is to at once evaporate it down by means of a water-bath, when it becomes very brittle and is readily reduced to powder, making up to original weight with some inert powder, as sugar of milk, and preserving in a stoppered bottle.

This is the form in which I always use it, and kept thus, it saves much valuable time in rapid dispensing.

To each pill is added $\frac{1}{4}$ grain each of *pulv. tragac.* and *pulv. althææ*, massing with spirit, just adding a few drops of syrup to keep it soft enough for rolling.

Some may think this a rather elaborate and lengthy process, but in practice, which is the chief consideration, it is simple, quick and reliable.

Fel bovinum being also of a hygroscopic nature, can be successfully dispensed in the same manner.

Of course, in selecting a pill excipient there are several important points to be taken into consideration, such as not to increase the size of the pill more than can possibly be helped, not to impair its solubility, nor to have any chemical action on the various ingredients, etc.

Trimethylaminæ hydrochlor. has been much prescribed in a pilular form just recently. This substance occurs in crystals which are ex-

tremely deliquescent, and in practice it is always better to allow them to completely liquefy in the mortar before attempting to make the mass. Out of several excipients tried, pulv. althææ and magnesia answered the best, the former helping to bind the mass and the latter absorbing the superfluous moisture. The strength usually ordered is 2 grains in each pill; this requires $1\frac{1}{2}$ grain of each of the powders.

Among the scale preparations ferri et quininæ cit. and beberinæ sulph. are sometimes ordered in pill; syrup is the best excipient for the former, and glycerin for the latter.

Inf. serpentariæ, prepared strictly according to the present Pharmacopœia, is incompatible with tr. iodi, with which it is sometimes prescribed. It is ordered to be made from the root in No. 20 powder, and thus a certain amount of starch is dissolved out, which, of course, in this case, combines with the free iodine to form iodide of starch, giving a dark-blue inky-looking mixture. This contrasts strongly with a similar mixture made with infusion prepared from the whole root, this remaining quite transparent, and containing free iodine, thus carrying out the intention of the prescriber, which it is the duty of every dispenser to do.

Specimens of the various pills mentioned in the paper, and the two infusions combined with iodine, were handed round for criticism and comparison.—*Phar. Jour. and Trans.*, December 3, 1887, p. 472.

ACTION OF ACIDS ON ZINC CONTAINING LEAD.¹

BY W. SPRING AND E. VAN AUBEL.

The authors have investigated the action of hydrochloric, hydrobromic, hydriodic, and sulphuric acids on zinc containing 0.6 per cent. of lead, prepared by melting zinc with litharge. The metal was cast into cylinders 17 mm. in diameter, covered with wax in such a way that only one of the basal planes was exposed to the action of the acid. The hydrogen evolved was collected in the apparatus previously used in investigations on the action of acids on marble (*Bull. Soc. Chim.*, xlvii, 927), and the volume of the gas was read off at regular intervals.

¹ *Ann. Chim. Phys.* [6], xi, 505-554. Reprinted from *Jour. Chem. Soc.*, 1887, p. 1074.

In all cases, the evolution of hydrogen is not the most rapid at the commencement of the reaction, that is, when the acid is strongest, but the velocity of the reaction increases until it reaches a maximum, and then decreases in such a way that the rate of solution is proportional to the concentration of the acid, and the portion of the curve beyond the maximum is a right line which cuts the axis of the abscissæ at a point corresponding with complete solution. The first part of the reaction, during which the rate of solution increases whilst the concentration of the acid diminishes, is abnormal, and represents a *period of induction*. If the second part of the curve is prolonged backwards, it cuts the axis of the ordinates at a point which gives the initial velocity on the assumption that there is no period of induction.

The theoretical initial velocity as thus determined increases with the volume of the acid used, the surface of zinc exposed remaining constant. Experiments show that the temperature of the zinc rises more rapidly than that of the surrounding liquid, the difference being greater the greater the mass of the liquid. This increase in the temperature of the metal of course increases the rate of solution. If the mass of the zinc varies whilst the exposed surface remains constant, the smaller the mass the higher the rate of solution, the greatest velocity being observed with spheres. This result is due to the fact that the temperature rises more rapidly in the case of the smaller masses. In the case of the more concentrated acids, spheres of zinc were employed, and this introduces a further complication, since the area of the surface is continually diminishing as the action proceeds, and the ratio of the surface to the mass is likewise changing. The correction required is given by the expression

$$S_1 = S_n (\sqrt[n]{n})^2.$$

Metallic zinc has no action on boiling solutions of zinc chloride.

The experiments were made at three different temperatures, 15°, 35°, and 55°, with hydrochloric acid of 5, 10 and 15 per cent., the strengths of the other acids being adjusted so that they were equivalent to the hydrochloric acid solutions.

With the three different concentrations of hydrochloric acid, the ratio of the rate of solution to the concentration of the acid is not the same in all three series when the whole period of solution is taken into account; but if the period of induction is eliminated in the manner already indicated, then the rate of solution in all cases is proportional

to the concentration of the acid. The slight variations of the curves from right lines are due to the differences between the temperatures of the zinc and the surrounding liquid. Measurements of the electrical resistance show that if electrical conductivity exerts any influence during the period of induction, it is without any sensible effect during the second part of the reaction. In order to ascertain the influence of electrolysis during the period of induction, zinc was immersed in hydrochloric acid of 15 per cent. at a temperature of 35°, the surface of the zinc being first covered with a thin layer of gold, platinum, lead, or copper. If the period of induction is due to electrolysis, the rate of solution during that period should vary with the electromotive force of the couple on the surface of the zinc. Possibly also, thermo-electric currents may be produced by the difference in temperature between the zinc and the surrounding liquid, or by differences between the temperature of different parts of the metal itself. Under these conditions, the actual initial velocity is very great, but gradually diminishes until it reaches a minimum, then rises and attains a maximum, and becomes a right line, indicating that the rate of solution is proportional to the concentration of the acid. It is evident from this result that the period of induction is the time during which the acid by slow action produces at the surface of the metal an infinite number of minute galvanic couples by exposing the particles of lead which are disseminated throughout the zinc. The great diminution in the rate of solution is probably due to the fact that the liberated hydrogen removes mechanically the particles of the foreign metal which had been precipitated on the surface of the zinc. The actual velocity at the commencement of the reaction increases in the following order: copper, gold, platinum, lead; whilst the theoretical initial velocity increases in the order, copper, lead, gold, platinum. Neither of these series follows the order of the electromotive force of the couples produced, and hence it is evident that although electrolytic action plays an important part in the solution of a metal in an acid, it is by no means the only determining cause.

No sensible variations in the rate of solution were observed when considerable quantities of sodium or potassium nitrate or sulphates were added to the liquid, and it would therefore seem that the velocity of the reaction is not greatly affected by the internal friction of the solution.

The influence of temperature is shown by a curve the ordinates of

which are the initial velocities whilst the abscissæ are the temperatures. These curves seem to be asymptotic to the axis of the temperatures, and the three curves for the three different degrees of concentration of the acid converge at a point which corresponds with a temperature of -60° to -70° . This result seems to indicate that at a temperature below -70° hydrochloric acid will have no action on zinc whatever the concentration of the acid, and it is of interest to recall the well-known fact that liquid hydrogen chloride, which liquefies at about -70° , has no action on this metal.

According to Kohlrausch, the maximum conductivity of hydrochloric acid corresponds with a strength of 21 per cent. Acid of 25, 30, or 34 per cent., however, dissolves zinc more quickly than acid of 21 per cent., and from this and the previous results it is evident that the conclusion of De la Rive and of Kajander, that the rate of solution is intimately connected with the electrical conductivity of the acid, is not confirmed.

With hydrobromic acid, the rate of solution is much higher than with hydrochloric acid of corresponding concentration. Under ordinary conditions the curve is not a right line at any phase of the reaction, a result due to the fact that with an increased rate of solution the difference between the temperature of the liquid and that of the metal is much greater, and the perturbations due to this cause are greatly increased. If the conditions are such that the temperature of the zinc is kept constant, it is found that the period of induction is very short, the velocity of solution rapidly attains a maximum, and then decreases with the concentration of the solution, the latter part of the curve being a right line. It is a general result that the period of induction is shorter the greater the concentration of the acid. With hydrochloric acid of 30 per cent., for example, there is practically no period of induction, and the maximum velocity is attained at once. The theoretical initial velocity with hydrobromic acid is 2.29 times that with hydrochloric acid.

With hydriodic acid, the velocity during the period of induction is less than in the case of hydrochloric acid, and the difference is greater the weaker the acids, but after the maximum velocity is attained the rate of solution is the same for both acids, and if the curves are drawn on a small scale they coincide. It follows, of course, that the theoretical initial velocities are practically the same for both acids.

The results with the three haloïd acids are quite different from those obtained in the case of the action of the same acids on marble (*loc. cit.*), in which case the rate of solution is the same for all three. The velocity of the reaction with zinc has no simple relation to the electrical conductivity of the acids, their heats of neutralization, or the solubilities of the salts produced.

With sulphuric acid, the action is very slow, and the rate of solution could not be measured with an acid corresponding with 10 per cent. hydrochloric acid. The period of induction lasts for several hours, and hence the metal was always previously covered with a film of precipitated lead. At 36°, the velocity is only one twenty-seventh of that observed in the case of hydrochloric acid. It is possible that the reaction is not of the same kind as with the haloïd acids. It may be that the formation of zinc sulphate in this way is almost entirely a phenomenon of electrolysis, and that the chemical attraction of the acid for the metal is not the determining cause as with the haloïd acids. In the latter case, there is simple substitution of the metal for the hydrogen of the acid, whilst the formation of zinc sulphate may be the result of a series of reactions, such as $\text{Zn} + \text{H}_2\text{SO}_4 = \text{ZnO} + \text{H}_2 + \text{SO}_3$; $\text{SO}_3 + \text{H}_2\text{O} + \text{Aq} = \text{H}_2\text{SO}_4 + \text{Aq}$; $\text{ZnO} + \text{H}_2\text{SO}_4 = \text{ZnSO}_4 + \text{H}_2\text{O}$.

Pure zinc, rubbed on the surface with metallic lead, does not dissolve in acids with a velocity similar to that of zinc alloyed with lead, or zinc covered with lead by precipitation. The black residue left on solution of the zinc containing lead is pure lead. The difference in the electromotive force in these cases may be due to the state of division of the lead, or possibly the black substance is an allotropic modification of the lead. If pure zinc is rubbed with this lead-black by means of a spatula, it becomes more soluble in acids. Mercury amalgamates and dissolves the lead-black, and this is probably the reason why amalgamated zinc is not soluble in acids. d'Almeida's view that amalgamated zinc is as soluble as ordinary zinc, but has the property of condensing on its surface a layer of hydrogen which protects it from the acid, is not supported by any evidence.

Note by Abstractor.—L'Hôte has recently shown that perfectly pure zinc does not decompose water, and is not soluble in acids. According to Osmond and Werth, impure zinc when dissolved in acids leaves graphitoidal residues of complicated composition. In one case the composition of the residue agreed with the formula Pb_2Zn .

THE ANTISEPTIC ACTION OF HOPS.¹

By DR. HAYDUCK.

In a previous communication the author had stated, as the result of experiment, that hops do not influence detrimentally the alcoholic fermentation, but that on the other hand they retard the lactic acid fermentation. In a further investigation the author has sought to ascertain to which of the hop constituents this antiseptic action is due.

Oil of hops, as well as the hop tannin, proved inactive in suppressing the lactic acid fermentation. Better results were obtained with the bitter acid, as well as with certain resinous constituents which were separated by the following process:—

The hops were perfectly extracted with ether, and the extract, after removal of the ether, was dissolved in alcohol; this left a residue of a white wax which occurs in hops in considerable quantity, but which is of no importance in brewing. The alcohol solution was then treated with an alcoholic solution of acetate of lead, which threw down an abundant yellow precipitate. This was separated by filtration, carefully washed, and decomposed with sulphuretted hydrogen, yielding eventually a soft resin. The filtrate, after removal of the alcohol, was treated with light petroleum spirit, which took up a second soft resin that was left on evaporation of the petroleum. In the residue there was left a hard resin, which was insoluble in light petroleum spirit, but readily soluble in ether and alcohol.

In this way therefore three well characterized resins were separated from the hops:—

(1) A soft resin, precipitated by lead. If an ethereal solution of this resin be treated with solution of copper sulphate the ether is colored an intense green; the resin therefore appears to form with copper sulphate a green compound soluble in ether. This resin is also soluble in light petroleum spirit.

(2) A soft resin that corresponds with the preceding in being soluble in light petroleum spirit and in giving the copper reaction, but differs from it in not being precipitated by lead.

(3) A hard resin which is not precipitated by lead, does not give the copper reaction, and is insoluble in light petroleum spirit.

The bitter acid is not obtained by this process.

¹ From the *Pharmaceutische Centralhalle*, Oct, 27; reprinted from *Phar. Jour. and Trans.*, December 17, 1887, p. 500.

All three of the resins behave like weak acids; in aqueous solution they are very instable and readily decomposed. The solubility of the resins in water is not constant, but if a quantity of resin be boiled with successive quantities of water the solubility gradually decreases.

No. 2 resin is related to the bitter acid of hops in that the acid is converted by oxidation into this resin. By numerous experiments it was ascertained that both this and the other soft resin, which appears not to have any relation to the bitter acid, act in a high degree upon the lactic acid bacteria as antifermentatives. On the other hand, the faintly bitter hard resin, which is contained in hops in larger quantity, has little or no antiseptic influence upon the lactic acid bacteria. All that can be said is that in the presence of this resin the development of the lactic acid bacteria goes on more slowly than in its absence. Neither of the resins influences the growth of mould.

The different bitter constituents of hops were also examined as to their influence upon the acetic acid bacteria, and it was found that the development of these organisms was not retarded by the resins.

THE INFLUENCE OF SACCHARIN UPON THE ACTION OF SOME FERMENTS.

By E. J. MILLARD.

As various vague and conflicting statements have been made as to the anti-fermentive character of saccharin, it was thought worthy of interest to ascertain its influence upon the more common ferments, such as pepsin, pancreatin, diastase and papain.

In all experiments a saturated aqueous solution of saccharin, containing about 0.2 per cent., was employed.

Pepsin.—The usual B. P. test proportions were taken, one experiment having the saturated solution of saccharin instead of distilled water. Maintained at 54°C. for twenty minutes, little or no difference was observable between them, in each case the albumin having been nearly dissolved. To ascertain the exact relationship, they were both at this stage filtered on tared filters, dried and weighed.

The albumin with saccharin solution weighed 16 grains, whilst the normal weighed 13 grains. It is evident, therefore, that saccharin has very little retarding influence over pepsin.

Pancreatin.—The effect of saccharin was tried both with pancreatin upon casein, and also upon starch.

In the former no hindrance was effected by saccharin, and even in large proportions it failed to appreciably affect the value and activity of the proteolytic ferment.

On starch, however, saccharin was found to interfere very materially with the amylolytic property of the ferment, and ten times the amount of ferment was required; but it was also found that if sodic bicarbonate were present in sufficient amount to neutralize the saccharin, no appreciable retardation took place.

Diastase.—Again saccharin showed a distinct retarding action, more than double the quantity of diastasic ferment being required to effect the same amount of conversion of starch as the ferment without saccharin performed. At a meeting of the Manchester Medical Society Dr. Dreschfeld stated that saccharin increases the diastasic power of malt. This is only true if the saccharin is first neutralized with alkali; the increase then, however, is very slight.

Papain.—Saccharin failed to affect to any marked extent the action of a sample of papain upon moist fibrin. The two experiments, the one with, and the other without saccharin, were stopped before complete conversion had taken place, and the undissolved portion filtered, dried and weighed; showed a difference of only a few grains against the saccharin experiment.

In view of the increasing uses of saccharin it is important to note that its antifermentive influence is to a great extent neutralized by the use of alkali, especially when it is employed with the amylolytic ferments; but it hardly seems so essential with the proteolytic ferments.

Professor Salkowsky¹ reports that the antiseptic property of saccharin is greatly diminished when neutralized; in that case it appears that saccharin, like benzoic and salicylic acids, is deprived in a marked degree of its power of affecting the ferments when it loses both its acid nature and antisepticity.—*Phar. Jour. and Trans.*, December 3, 1887, p. 471.

Oat flour in the treatment of burns is recommended by Greene (*Brit. Med. Jour. N. Y. Med. Jour.*), on the score of its freedom from odor, its soothing and anti-septic properties, its superior healing power, its cheapness, and the ease with which it can generally be obtained at short notice. He directs a paste to be made of equal parts of the flour and fresh (unsalted) lard, to be applied spread on lint or old calico, the application to be renewed every day, or every second day, according to the exigencies of the case.

¹ *Chem. Zeitung*, December 6, 1886.

URINARY PIGMENTS.¹

BY L. V. UDRANSZKY.

On looking over the literature of the subject of urinary pigments, which extends from the beginning of the present century, it is found that the following conclusions can be drawn from the work at present done on the subject:—(1.) By the action of oxidizing agents, indigo-blue and other indigo compounds, for example, indirubin, can be obtained from normal urine. (2.) In most cases urobilin, which is identical with hydrobilirubin, is also present. (3.) In addition to the foregoing, pigments are obtained by boiling the urine with mineral acids, and are probably derived from the splitting up of certain chromogens in the urine by these strong reagents: to one of these, the name uromelamin is given. It is to the investigation of this third class of pigments that the present research is mainly directed. A litre of normal urine was heated for a quarter of an hour with 5 per cent. hydrochloric acid, and extracted with amyl alcohol; on evaporating the alcoholic extract, a brownish-black, amorphous residue was obtained weighing 0.68 gm. This is the ordinarily received method of obtaining this pigment. The experiment was repeated, using distilled water instead of urine, and a residue weighing 0.51 gm. was obtained, having the same characters, including spectroscopic appearances. The prolonged action of hydrochloric acid in the cold has the same action on amyl alcohol. What this resinous substance is was not further investigated; it was found, however, that the alcohol after distillation still possessed the same action on polarized light as previous to the separation of the pigment from it. This admixture of the resinous substance from the reagents used with the urinary pigment could not be prevented by attempting to wash the acid away from the alcohol by the use of water; it was not found possible to remove the acid in this way. By neutralizing the mixture with chalk, however, the author considers he has been able to obviate this source of error. On account, however, of the unsatisfactory nature of amyl alcohol as a reagent, a method was sought for in which it was not necessary to employ it. The method ultimately adopted was as follows:—Normal urine was evaporated to about one-sixth of its original bulk at 60°;

¹ *Zeit. physiol. Chem.*, xi 537—560. Reprinted from *Jour. Chem. Soc.* 1887., p. 1133.

10 per cent. hydrochloric acid was then added, and after 48 hours the crystals of uric acid thus formed were filtered off. The filtrate was boiled for 18 hours, at the end of which time the remains of the uric acid with an abundance of pigment were precipitated; the filtrate had an orange-red color; to this, chalk and sodium phosphate were added; the bulky precipitate which was formed carried down with it the remains of pigment. The precipitate obtained from the urine by boiling was washed with cold water, hot water, alcohol and ether, dissolved in dilute sodium hydroxide solution, and precipitated by sulphuric acid. This was repeated three times, and the final product was a bright, brownish-black substance, occurring in plates but easily powdered. It was insoluble in cold water, dilute alcohol, ether, and chloroform, sparingly soluble in warm water, absolute alcohol, light petroleum, and concentrated sulphuric and hydrochloric acids. It was easily soluble in amyl alcohol, concentrated ammonia, but especially in solutions of potassium or sodium hydroxide. It can be heated to 115° without decomposition; with soda-lime it yields ammonia; on dry distillation, it gives a smell of formic acid, and after complete combustion leaves a minimal amount of ash which contains no iron. The average quantity in which it occurs in urine is 0.03 per cent. By the action of potash, it yields ammonia, formic acid, acetic acid, butyric acid, palmitic acid (?), catechol, protocatechuic acid, and the residue is free from nitrogen, and has the following percentage composition:—Carbon, 62.26; hydrogen, 3.9; and oxygen, 33.84.

ALDEHYDE RESIN.¹

By E. PUCHOT.

Aldehyde resin washed two or three times with warm water and exposed to air becomes hard and friable. It dissolves in alcohol and is precipitated by water. Analysis of two preparations gave the formula $C_{48}H_{64}O_{10} + nH_2O$, n being equal to 4, but the amount of water is variable. When exposed to dry air, the resin gives off water, and its weight gradually reaches a minimum at which it remains constant for some time, and then increases. When the weight is at the minimum,

¹ *Ann. Chim. Phys.* [6], ix, 422. Reprinted from *Jour. Chem. Society*, 1887, p. 1060.

the substance has the composition $C_{48}H_{64}O_{10} = 8(C_6H_8O) + O_2$, which varies slightly with the rate of drying. When the increase in weight has become constant, the composition is $C_{48}H_{64}O_{12} = 8C_6H_8O + O_4$. If the resin is exposed to moist air, its weight increases, and becomes constant after some weeks; if it is then exposed to dry air, the weight diminishes until it reaches a new limit. The composition at this last stage is not constant, but approximates to $C_{48}H_{64}O_{12}$. The substance formed in contact with moist air is probably a hydrate, but its composition was not determined.

In some cases, the crude resin was first placed in dry air, then before the loss of weight was complete, in moist air, and finally in dry air again. After this treatment, it had the composition $C_{48}H_{66}O_{13} = C_{48}H_{64}O_{12} + H_2O$, but this result was not constant. In another case, the composition was $C_{48}H_{64}O_{12}$. The change of weight which the resin undergoes shows that the increase of weight is not due to simple combination with oxygen, but there is simultaneous loss of carbon, increased weight being always less than corresponds with the increased percentage of oxygen. Either of the resins first mentioned increases in weight in moist air, but regains its original weight in dry air, the hydrate formed under the first conditions being decomposed in the dry air. Hydrates are obtained containing 2, 3, 5, or 7 mols. H_2O .

The resin was placed alternately several times in dry air and in air saturated with the vapor from a saturated solution of sodium chloride. The dry substance had the composition $C_{48}H_{68}O_{14}$. In the moist atmosphere, there is an increase in the percentage of oxygen, but a decrease in the percentage of carbon, which may be due either to formation of a hydrate or to oxidation with simultaneous loss of carbon.

From these results it follows that crude aldehyde resin loses water, and forms the compound $C_{48}H_{64}O_{12}$ or $8(C_6H_8O) + O_2$, which may be regarded as an oxidized polymeride of trialdane. This substance yields more highly oxidized products which may be regarded as hydrated oxides of the same aldane. Members of the latter series absorb water from a moist atmosphere, and form hydrates which decompose in dry air. When aldehyde resin is gradually heated from 120° to the boiling point of sulphur, it undergoes condensation. Water and an oily liquor are given off, and a non-volatile residue containing a high percentage of carbon is left in the retort.

CHLORACETONES.¹

By C. CLOEZ.

The author has prepared and examined all the chlorine derivatives of acetone which are theoretically possible if the generally accepted formula is correct. A short history of the derivatives previously known is given, together with full bibliographical references.

The material employed was commercial acetone purified by fractionation and conversion into the hydrogen sodium sulphite compound. The author investigated the action of chlorine: (1) on cold acetone; (2) on acetone which at first was cold, but afterwards was heated to 100°; (3) on well-cooled acetone containing iodine; and (4) on boiling acetone containing iodine. No advantage is gained by the presence of iodine, and in fact the iodo-products which are formed in small quantity decompose during distillation and render purification very difficult. The iodine cannot be removed by means of iron or mercury. All fractions boiling above 125–130° should be distilled under reduced pressure. The final product in all four cases is tetrachloracetone.

Monochloracetone is most readily prepared by Barbaglia's method (*Ber.*, vii, 467) of passing chlorine into well-cooled acetone for several days; a current of water is sufficient for this purpose, a freezing mixture is not necessary. It boils at 117–118°; sp. gr. at 13° = 1.158. It is very slightly soluble in water, but dissolves in all proportions in alcohol, ether, and chloroform. It does not form a crystalline hydrate, and volatilizes readily in water-vapor. When freshly prepared, it has no irritating odor, but after exposure to air for some days it gives off irritating vapors. It can, however, be purified by washing with a very dilute solution of an alkali.

Monochloracetone is readily attacked by chlorine in the cold. Bromine has little effect in the cold, but at 100° energetic reaction takes place with formation of chlorotribromacetone. With potassium, it forms potassium chloride, together with red and brown products which probably contain the acetyl carbinol obtained by Emmerling by the action of potassium or potassium carbonate on bromacetone. Ammonia produces ammonium chloride and the amido-derivative, $\text{COMe}\cdot\text{CH}_2\text{-}$

¹ *Ann. Chim. Phys.* [6], ix, 145–221. Reprinted from *Jour. Chem. Soc.*, 1887, p. 1091–1099.

NH_2 , which when distilled with potash yields methylamine. It follows that monochloracetone has the constitution $\text{COMe}\cdot\text{CH}_2\text{Cl}$.

The action of a warm concentrated solution of potash on dichlorhydrin yields a liquid closely resembling monochloracetone in its physical properties. It boils at $118\text{--}119^\circ$; sp. gr. at $11^\circ = 1.194$. It combines with hydrochloric and acetic acids, forming derivatives of glycerol, and it also combines with water. With alcoholic ammonia, it yields the badly defined compound hemichlorhydramine, $\text{C}_3\text{H}_{12}\text{ClNO}_2$; this is evidently not an acetone-derivative, and it most probably has the constitution $\text{CH}_2\text{Cl}\cdot\text{CH} < \begin{smallmatrix} \text{CH}_2 \\ -\text{O}- \end{smallmatrix} >$.

Dichloracetone is best prepared by the prolonged action of chlorine on well-cooled acetone. It boils at 120° , whilst the monochloro-derivative boils at 117° , but the two compounds may be separated by taking advantage of the fact observed by Mulder and by Barbaglia, that the product obtained under these conditions has the composition of the dichloracetone even in the fraction boiling at 170° . The fraction boiling at $125\text{--}170^\circ$ is collected separately and purified by further fractionation. The pure compound boils at 120° ; sp. gr. at $15^\circ = 1.234$. It combines readily with sodium hydrogen sulphite, and the compound crystallizes with 3 mols. H_2O . Even when carefully purified, the vapor acts energetically on the eyes, etc., but after some time the organs become insensitive to its action. Ammonia acts rapidly on dichloracetone, with formation of ammonium chloride and the base $\text{COMe}\cdot\text{CHCl}\cdot\text{NH}_2$, which yields methylamine when distilled with potash.

The product of the action of chlorine on cooled acetone has the composition of the dichloro-derivative even in the fraction boiling at 170° , but on redistillation the boiling point is reduced to 120° . Barbaglia obtained a liquid which boiled at $165\text{--}170^\circ$, and when cooled solidified to a mass of bulky, prismatic crystals melting at 44° . In its physical properties, this product resembles symmetrical dichloracetone, but with bromine it yields a dichlorodibromacetone identical with that obtained from unsymmetrical dichloracetone, and very different from the corresponding compound obtained from the symmetrical derivative. This high boiling fraction may be a polymeride.

Symmetrical dichloracetone is obtained by the action of silver chloride on the symmetrical diiodoacetone prepared by the action of iodine chloride on acetone in presence of water. It has a pungent

odor, forms crystals which melt at 44° , and boils at 170° without decomposition.

When dichlorhydrin is oxidized by means of a well-cooled mixture of sulphuric acid and potassium dichromate, in the manner described by Grimaux and Adam, it yields a liquid which has the composition of dichloracetone. When this product is cooled, it crystallizes in large needles melting at $43-44^{\circ}$, which change spontaneously, especially in presence of ether, into short prisms with the same melting point. It boils at 170° , has a very pungent odor, and in ethereal or alcoholic solution is a most powerful caustic, producing very severe burns. With ammonia, it forms an unstable compound which crystallizes in large plates.

In diffused daylight, chlorine acts somewhat slowly on epichlorhydrin. When the product is distilled and the fraction boiling at $160-180^{\circ}$ is purified, it yields a liquid which boils at 170° and has the composition $\text{CHCl}_2\cdot\text{CH} < \begin{smallmatrix} \text{CH}_2 \\ -\text{O}- \end{smallmatrix} >$, and is therefore an isomeride of dichloracetone. With ammonia at a low temperature, it yields a white, amorphous, unstable substance, almost insoluble in water, alcohol, and ether; this has the formula $\text{C}_6\text{H}_4\text{Cl}_2\text{NO}_2$, but its constitution could not be determined.

The dichloracetone obtained from diiodoacetone is not identical with the so-called symmetrical dichloracetone obtained by the oxidation of dichlorhydrin. The action of bromine, potash, or oxidising agents on dichlorhydrin yields derivatives which closely resemble derivatives of the acetones, but are never identical with them. Potash yields epichlorhydrin, which closely resembles monochloracetone in its physical properties. Bromine yields a derivative to which the constitution $\text{CO}(\text{CHClBr})_2$ has been assigned. A compound, $\text{CHCl}_2\cdot\text{CO}\cdot\text{CHBr}_2$, can also be obtained from acetone. If the two compounds are treated with mercuric chloride the latter yields tetrachloracetone, whilst the former yields a compound containing a lower percentage of chlorine.

If ordinary dichloracetone and the symmetrical dichloracetone from the iodo-derivative are treated with bromine, they both yield dichlorodibromacetones, and when the latter are treated with mercuric chloride the same symmetrical tetrachloracetone is obtained in both cases. When the pseudodichloracetone from dichlorhydrin is treated in the same way, the product is an isomeride of tetrachloracetone, very dis-

tinct from either of the compounds $\text{CO}(\text{CHCl}_2)_2$ and $\text{CCl}_3\cdot\text{CO}\cdot\text{CHCl}$. Since only two tetrachloracetones can exist, it follows that the derivative from dichlorhydrin is not an acetone-derivative. Again, when dichloracetone and the pseudodichloracetone are subjected to the action of chlorine in sunlight, the products are very different, although both have the composition of pentachloracetone. Only one pentachloracetone is, however, possible. The pseudodichloracetone is a derivative of dichlorhydrin, $\text{CH}_2\text{Cl}\cdot\text{CH}(\text{OH})\cdot\text{CH}_2\text{Cl}$, and has the constitution $\text{CH}_2\text{Cl}\cdot\text{CH} < \begin{smallmatrix} \text{CHCl} \\ \text{O} \end{smallmatrix} >$, analogous to that of epichlorhydrin. Pseudodichlorhydrin does not combine with acetic acid. It reacts violently with concentrated hydrochloric acid, but when the product is evaporated over sulphuric acid the original compound is obtained.

Trichloracetones.—When a limited quantity of bromine is allowed to act on dichloracetone, the product $\text{CHCl}_2\cdot\text{CO}\cdot\text{CH}_2\text{Br}$ is obtained, which boils at 111° under a pressure of 25 mm., and when this is heated with mercuric chloride in presence of alcohol, trichloracetone boiling at 172° is obtained. This trichloracetone yields no chloroform with aqueous or alcoholic ammonia, and no phenylcarbylamine with aniline and potash. It therefore does not contain the group CCl_3 , and must have the constitution $\text{CHCl}_2\cdot\text{CO}\cdot\text{CH}_2\text{Cl}$. Only a very small quantity was obtained.

Trichloracetone, $\text{CCl}_3\cdot\text{CO}\cdot\text{CH}_3$, is readily obtained by the action of chlorine on an aqueous solution of sodium citraconate heated at 100° (Gottlieb and Morawsky, *J. pr. Chem.* [2], xii, 369). With ammonia, it yields chloroform and a small quantity of ammonium chloride, together with a large quantity of acetamide if the liquid has been kept cool and excess of ammonia has been avoided.

The action of chlorine on impure methyl alcohol (Bouis) or on acetone (Bischoff) yields a liquid which has the composition of trichloracetone and boils at 172° ; sp. gr. 1.418. It solidifies incompletely in long needles at -14° , the temperature rising suddenly to -5° . The crystals melt between -5° and $+2^\circ$. It combines with 2 mols. H_2O , forming a hydrate which melts at $43-44^\circ$. It also combines with sodium hydrogen sulphite, but the product crystallizes with great difficulty. With aniline and potash, it yields phenylcarbylamine; but with ammonia it yields very little, if any, chloroform or acetamide, ammonium chloride, however, is formed in large quantities, and if the liquid is distilled with potash, it yields dichloromethyla-

mine, which is doubtless derived from the compound $\text{CHCl}_2 \cdot \text{CO} \cdot \text{CH}_2 \cdot \text{NH}_2$. It would follow that the trichloroacetone has the constitution $\text{CHCl}_2 \cdot \text{CO} \cdot \text{CH}_2 \text{Cl}$, but the formation of chloroform and phenylcarbylamine, and the variable boiling and melting points of the compound, show clearly that it is a mixture of a solid trichloro-derivative which melts about -5° , with an isomeride which is liquid even at low temperatures.

Unsymmetrical tetrachloroacetone was obtained by Bouis by the action of chlorine on wood-spirit in diffused daylight (*Ann. Chim. Phys.* [3], 21—111), and by Bischoff by the action of chlorine on a mixture of acetone and methyl alcohol (1876). It is most readily obtained by passing chlorine into commercial acetone, the temperature being allowed to rise. Tetrachloroacetone is a colorless liquid which boils at 180° — 182° , and becomes brown when exposed to air and light; sp. gr. at $17^\circ = 1.482$. When distilled under the ordinary pressure, it undergoes partial decomposition. It is very hygroscopic, and forms a tetrahydrate which melts without decomposition at 30° . With aniline and potash it yields phenylcarbylamine, and with aqueous ammonia at a low temperature it yields chloroform and monochloroacetamide. It therefore has the constitution $\text{CCl}_3 \cdot \text{CO} \cdot \text{CH}_2 \text{Cl}$.

By the prolonged action of chlorine on pure acetone at first cooled and afterwards heated on a water-bath, Grabowsky (1876) has obtained trichloromethyl propyl ketone, boiling at 186° . The author has been unable to obtain this result. Probably the nature of the reaction depends on the purity of the acetone.

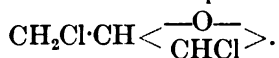
Symmetrical tetrachloroacetone.—Dichlorodibromacetone prepared by the action of bromine on unsymmetrical dichloroacetone is heated with alcohol and mercuric chloride in sealed tubes at 100° . The product is distilled, and is purified from mercury by conversion into a hydrate which is repeatedly recrystallized, and then decomposed by hydrochloric acid. The product is dried over calcium chloride, and boils at 179° — 181° ; its sp. gr. is the same as that of the preceding compound. With water, it forms a hydrate crystallizing in needles which melt at 47° — 48° . With ammonia or aniline, it yields no distinct result, but neither chloroform nor phenylcarbylamine is formed. The compound therefore does not contain the group CCl_3 , and must have the constitution $\text{CHCl}_2 \cdot \text{CO} \cdot \text{CHCl}_2$.

The dichlorodibrom-derivative obtained by the action of bromine on dichlorohydrin yields with mercuric chloride an oily liquid which

has no fixed boiling point, and is not attacked by ammonia at the ordinary temperature. It is not a tetrachloracetone.

When the product of the oxidation of dichlorhydrin is treated with bromine, it yields an isomeride of dichlorodibromacetone, which, according to Markownikoff, has the constitution $\text{CHClBr}\cdot\text{CO}\cdot\text{CHClBr}$. When this compound is treated with mercuric chloride, however, it yields a liquid which fumes in the air, boils at about 180° , has a disagreeable odor, and does not combine with alkaline hydrogen sulphites. With ammonia or aniline, it yields neither chloroform nor phenylcarbylamine, but dichloracetamide and dichloracetanilide respectively. It follows that either there are two isomeric symmetrical tetrachloracetones, or that the product of the oxidation of dichlorhydrin is not an acetone derivative, as already indicated.

When symmetrical iodacetone is treated with silver chloride, and the product is treated with bromine and afterwards with mercuric chloride, a liquid is obtained which boils at 180° , and is identical with symmetrical tetrachloracetone. The dichloracetone from iodacetone has always been regarded as identical with Markownikoff's products, but these results show that they are very different, and the latter is most probably a derivative of epichlorhydrin—



Pentachloracetone was obtained by Staedeler by adding hydrochloric acid to a boiling solution of quinic acid and potassium chlorate. The yield is very small, and great care is required to avoid explosions. Much better results are obtained by the following method. A solution of citric acid in 1.5 parts of water is allowed to fall drop by drop down a tube packed with pumice, up which passes a current of dry chlorine, the tube being heated at 100° by means of a water-jacket. The product is purified by washing and redistillation. If the water used for washing is evaporated at a low temperature, it deposits crystals of citric acid which contain 2 mols. H_2O , and are quite different in appearance from the ordinary crystals. They form flattened prisms with four of the faces abnormally developed. The cleavage planes and the angles at the edges are, however, identical with those of the ordinary crystals.

The pentachloracetone obtained is identical with that prepared by Staedeler and by Cloez, sen., by the action of chlorine on alkaline citrates. With ammonia, it yields chloroform and dichloracetamide,

and with aniline it yields phenylcarbylamine and dichloroacetanilide. It may also be prepared in large quantity by the action of dry chlorine on dry commercial acetone in direct sunlight. Pure acetone seems to give a different result, since Fittig, and Dumas and Kane, obtained no derivative higher than the dichloroacetone by the action of chlorine on acetone at 100° or in sunlight. Under the conditions given, however, the acetone is converted into a mixture of pentachloroacetone and hexachloroacetone which are separated by fractionation.

Pentachloroacetone is a colorless liquid with an odour resembling that of chloral, which, however, is only observed after the liquid has been exposed to air. It boils at 192°, and is readily volatile in water vapor; sp. gr. at 14° = 1.576. It dissolves in 10 parts of water, from which it separates completely at 50—60°. At low temperatures, the solution deposits a tetrahydrate in small, rhomboidal plates melting at 15° with decomposition. With ammonia, it yields chloroform and dichloroacetamide.

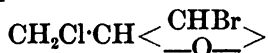
The action of chlorine in sunlight on the pseudodichloroacetone from dichlorohydrin yields a liquid which has a pungent smell, and boils at 185°; sp. gr. at 8° = 1.617. With ammonia, it yields trichloroacetamide but no chloroform, and hence it is not a derivative of acetone. The action of chlorine on dichloropropylene oxide yields a strongly fuming liquid which boils at about 178°. Its composition does not agree very well with that of pentachloropropylene oxide, and when treated with ammonia, it yields trichloroacetamide but no chloroform. It therefore has the constitution $\text{CHCl}_2 \cdot \text{CCl} < \begin{smallmatrix} \text{CCl}_2 \\ -\text{O}- \end{smallmatrix} >$. From these results, it is evident that there are three isomeric compounds having the composition of pentachloroacetone, but only one of these is really a derivative of acetone.

Hexachloroacetone was obtained by Plantamour by the action of chlorine on a solution of citric acid in sunlight, and has been described under different names by Laurent, Staedeler, and Cloez, sen. A solution of citric acid is treated with chlorine in sunlight until the gas is no longer absorbed. Carbon dioxide is given off, especially in the later stages of the reaction. The yield is about one-fourth of the weight of the citric acid taken. Hexachloroacetone can readily be obtained by the action of chlorine on acetone in sunlight. The fraction of the product which boils at 185—220° is collected and purified.

The fraction boiling at 290° contains a considerable quantity of hexachlorobenzene, which is probably formed by pyrogenic decomposition, and does not exist in the product before distillation. It is not always formed.

Hexachloracetone is a very limpid liquid with an odor which is feeble at a low temperature, but becomes very pungent and irritating when the liquid is warmed. It boils without decomposition at 202—204°, and when cooled solidifies in large, white plates melting at —2°; sp. gr. at 12°=1.744; vapor density 9.615. It is slightly soluble in water, and forms a crystalline monohydrate which is almost insoluble in water. With aqueous ammonia, it yields chloroform and trichloracetamide, and with aniline it yields chloroform and trichloracetanilide. When heated with water in sealed tubes at 120°, it splits up into chloroform and trichloroacetic acid. The action of chlorine on epichlorhydrin in sunlight yields crystals which seem to be hexachlorobenzene, and a small quantity of a liquid which boils at 200—210° and yields chloroform and trichloracetamide with ammonia. Most probably the product has the constitution $\text{CCl}_3\cdot\text{CCl}<\underset{\text{O}}{\text{CCl}_2}>$.

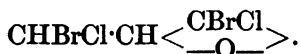
Chlorobromacetones.—Theegarten treated epichlorhydrin with bromine, and oxidized the product. In this way, he obtained crystals which have an irritating odor, melt at 34—35°, and boil at 177—180°. This compound is only slightly soluble in water, but dissolves readily in alcohol and ether. It does not combine with bisulphites, and doubtless has the constitution



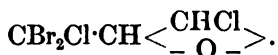
A compound with the composition of monochlorotribromacetone was obtained by Claus and Lindhorst (1880) by the action of bromine and water on dichlorhydrin, and by Grimaux and Adam by the action of bromine on epichlorhydrin at 100°. With equal molecular proportions of bromine and epichlorhydrin, the reaction is complete in a few hours. The product is a colorless, pungent liquid, heavier than water, with which it forms a hydrate melting at 55°, soluble in alcohol, and stable when exposed to air. The compound itself decomposes when boiled even under reduced pressure. It is not a true derivative of acetone, but is derived from epichlorhydrin.

When monochloracetone is heated with bromine at 100° and the

product dissolved in water, a tetrahydrate is formed which can be recrystallized. It is decomposed by hydrochloric acid, and when the liquid thus obtained is dried, it boils at 130° under a pressure of 25 mm., and at 215° under normal pressure; sp. gr.=2.270. It has a pungent, irritating odor. The hydrate is only slightly soluble in water, but dissolves more readily in alcohol of 80° , from which it crystallizes in large, hexagonal tables containing 1 mol. H_2O ; this is readily given off even on exposure to the air. With aqueous ammonia at a low temperature, chlorotribromacetone yields bromoform and chloracetamide, and therefore has the constitution $CBr_3 \cdot CO \cdot CH_2Cl$. So-called dichlorodibromacetone, obtained by the action of bromine on pseudodichloracetone, is a liquid which solidifies at -14° , melts at -8° , and boils at 135° under a pressure of 40 mm. It does not combine with alkaline hydrogen sulphites. It forms a tetrahydrate, which crystallizes in long prisms melting at $53-54^{\circ}$ with partial decomposition. The action of ammonia shows that this compound contains neither CCl_2Br nor CBr_2Cl , and hence its constitution must be



The action of bromine on dichlorhydrin yields a compound which boils at $140-141^{\circ}$ under a pressure of 20 mm. It forms a crystalline tetrahydrate which melts at $55-56^{\circ}$, and boils with partial decomposition at $140-150^{\circ}$ under a pressure of 20 mm. It is not identical with the preceding compound, and may have the constitution



The action of bromine on ordinary dichloracetone yields a liquid which boils at 120° under a pressure of 25 mm., and does not solidify at a low temperature. It forms a tetrahydrate which crystallizes in hexagonal tables with a very disagreeable odor; these readily lose their water. Barbaglia's dichloracetone boiling at 170° yields the same derivative with bromine, and is therefore a polymeride of ordinary dichloracetone. Dibromodichloracetone reacts energetically with ammonia, but no chlorobromoform is produced, and hence the compound must have the constitution $CHCl_2 \cdot CO \cdot CHBr_2$. With mercuric chloride, it yields a tetrachloracetamide which does not contain the group CCl_3 .

When trichloracetone is treated with bromine at 100° , it yields a trichlorobromacetone, which boils at 107° under a pressure of 25 mm.,

and at 190° under the ordinary pressure. It is very hygroscopic, and forms a tetrahydrate which crystallizes in hexagonal tables melting at 48° . With ammonia, it yields chloroform and bromacetamide, and therefore must have the constitution $\text{CCl}_3\cdot\text{CO}\cdot\text{CH}_2\text{Br}$.

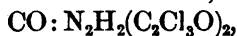
Tetrabromacetone forms a tetrahydrate, which, although unstable, crystallizes readily. With ammonia, it yields bromoform and bromacetamide.

All the chlorobromacetones described are tetra-substitution-derivatives. Starting from tetrachloracetone, each substitution of bromine for chlorine produces a rise of about 10° in the boiling point. There is also a gradual increase in the specific gravity.

Action of Ammonia and Amines on Chloracetones.—The action of orthotoluidine on hexachloracetone yields orthocresyltrichloracetamide, $\text{C}_6\text{H}_4\text{Me}\cdot\text{NH}\cdot\text{C}_2\text{Cl}_3\text{O}$, which crystallizes in large needles only slightly soluble in cold alcohol. It melts at $66\text{--}67^{\circ}$, readily remains in superfusion, and volatilizes at 215° . Paratoluidine yields the corresponding para-derivative, which crystallizes in very short rectangular prisms, melting at $79\text{--}80^{\circ}$, and volatilizing with partial decomposition at 185° . It is only slightly soluble in cold alcohol.

With diethylamine, hexachloracetone yields diethyltrichloracetamide, which is very soluble in alcohol, and crystallizes in prisms which melt at 90° and volatilize almost immediately with partial decomposition. With trimethylamine, dimethyltrichloracetamide is formed; this is very soluble in boiling alcohol, and crystallizes in radiating needles which melt at 104° , and sublime at 195° . With dimethylaniline, the reaction takes place only on warming, and the product is a mixture of a violet coloring matter, soluble in boiling water but almost insoluble in ether, and very soluble in chloroform, with another badly defined coloring matter. Allylamine yields allyltrichloracetamide, soluble in alcohol and in chloroform, and crystallizing in large tables which melt at 45° and volatilize without decomposition at 190° . With hexachloracetone and pentachloracetone respectively, ethylenediamine yields the two derivatives, $\text{C}_2\text{H}_4\cdot\text{N}_2\text{H}_3\cdot\text{C}_2\text{Cl}_3\text{O}$ and $\text{C}_2\text{H}_4\cdot\text{N}_2\text{H}_3\cdot\text{C}_2\text{HCl}_2\text{O}$. The first is soluble in alcohol, and crystallizes in elongated rhomboidal plates which melt at 200° and sublime at the same temperature. The second is soluble in warm alcohol, and very soluble in ether. It crystallizes from alcohol in elongated parallelograms, and from ether in fan-shaped plates.

When one molecular proportion of urea is heated at 150° with two molecular proportions of hexachloracetone, the amide—

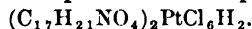


is readily obtained. It crystallizes from its alcoholic solution in yellowish, hexagonal plates.

CONTRIBUTION TO THE KNOWLEDGE OF THE COCA BASES.¹

By O. HESSE.

Almost simultaneously with the publication of my note on the alkaloïds of coca leaves in the *Pharmaceutische Zeitung*, appeared a communication from W. C. Howard,² in which that chemist referred to the alleged non-existence of "amorphous cocaine," and at the same time gave a brief description of a base that he considered to be hygrine, though it was obviously nothing else than the "amorphous cocaine" in question, but probably in a state of incomplete purification. Howard separated this base from cocaine by means of the corresponding platino-chloride, which he treated with a large quantity of water at a temperature of 80° C., and thus dissolved out the cocaine salt from the assumed hygrine salt, which remained undissolved. The base obtained from this salt was not entirely free from smell; it had an intensely bitter taste, formed an amorphous hydrochlorate, and the platinochloride contained from 18.48 to 18.6 per cent. of platinum. Howard is of opinion that this base contains three atoms of carbon more than cocaine, but he does not furnish any data to show that a carbon determination was made, and appears rather to have based that opinion upon the result of the platinum determination, overlooking the fact that this platinum salt contains about 5 per cent. of water. Probably this error has arisen from the circumstances that the air-dried cocaine platinochloride, being anhydrous, contains under the same conditions an amount of platinum corresponding to the formula—



Howard found that the amount of platinum in the platinochloride of this so-called hygrine, which was undoubtedly a hydrated salt, was

¹ From the *Pharmaceutische Zeitung*, Nov. 23, reprinted from *Phar. Jour. and Trans.*, Nov. 26, 1887.

² *Pharmaceutical Journal*, [3], vol. xviii., p. 71. *Amer. Jour. Phar.*, 1887, p. 453.

the same as that previously found by me in the same salt prepared from the amorphous portion of the coca bases.

	Howard.		Hesse.	
Pl.....	18.48	18.6	18.26	18.44
H ₂ O.....	not determined.		5.00	5.50

From these data alone it might be inferred that Howard's so-called hygrine was identical with the amorphous portion of the coca bases which I had prepared. So, likewise, the cocainoidine of Lyons and the cocaicine of Bender are in all probability in the main the same substance.

Since that time I have been engaged in the endeavor to prepare in a pure state the base of which these several products may consist to a greater or less extent, and by making use of broad-leaved coca I have succeeded in doing so without difficulty. After having with this object entirely separated the cocaine as hydrochlorate from the mixture of bases by a special process, the residual mixture, which was ascertained to be free from cocamine, was dissolved with dilute hydrochloric acid, and the solution mixed with ammonia in excess. The precipitate thus produced was separated from the mother-liquor and again dissolved with dilute hydrochloric acid and precipitated with ammonia, this operation being repeated until a portion of the precipitate gave with acids a solution which no longer showed any fluorescence when diluted with water, and was therefore quite free from actual hygrine.

The alkaloid thus purified was further washed with water at a temperature of 80° C., and was thus reduced to a melted mass, that was spread out upon glass plates and dried thoroughly at 60° C. In that condition when cold it could be detached in the form of transparent brittle laminæ, yielding a white powder that melted at about 51° C. In such a purified condition I call this alkaloid "cocaidine." Its composition is represented by the formula $C_{17}H_{21}NO_4$, yielding on analysis 67.2 per cent. carbon and 7.01 hydrogen, and it is therefore isomeric with cocaine and cocamine. It dissolves readily in ether, alcohol, acetone, chloroform, petroleum spirit, or benzene, but scarcely at all in water, ammonia solution, or caustic soda; it has an alkaline reaction, but does not alter phenolphthalein. At first it appears to be tasteless, but gradually develops, after a rapidly disappearing sense of numbness in the tongue, a bitter taste. A chloroform solution gives in the polariscope with $p=4$ and $t=20^\circ$ C. $(\alpha)_D^{20}=-20.6$, so that it

turns the plane of polarized light rather more strongly to the left than cocaine does.

Cocaidine, when perfectly dried, attracts water from the atmosphere and then cakes together. It is free from odor and does not volatilize with water vapor. When boiled with an alcoholic solution of baryta it splits up, yielding benzoic acid, but what other product is then formed has not yet been ascertained.

Cocaidine hydrochlorate has the form of an almost colorless varnish, readily soluble in water or alcohol, and but slightly hygroscopic. It is without smell, tastes intensely bitter, and does not appear to produce irritation of the mucous membrane. The platinochloride has a composition represented by the formula—



As regards hygrine, the statements of Lossen in reference to it are somewhat ambiguous, inasmuch as it appears that in part they apply to the substance obtained directly from the coca leaves that would have still contained cocaidine, and in part, also, to the product obtained from it by distillation with water. So much, however, is certain, that hygrine is a liquid as the name indicates, and that it is capable of being distilled with water vapor.

Since cocaine, cocaidine and cocamine are neither of them volatilizable when boiled with water, nor capable of yielding volatile bases by such treatment, these circumstances would point to a possible mode by which hygrine could be obtained if it were present. My observations in this respect are in complete accord with those of Stockman and Howard, according to whom the "crude amorphous cocaine" yields, when subjected to distillation with water, small quantities of an oily basic substance. The mother-liquor obtained as a bye-product in the purification of cocaidine is the most suitable source from which this oily base may be prepared. This liquid is mixed with some caustic soda and shaken out with ether, the ether solution evaporated, and the residue distilled with water to drive over the hygrine. The distillate is mixed with hydrochloric acid in slight excess, evaporated to dryness, and the hygrine separated from the residue by shaking with caustic soda and ether. The brown oily residue obtained on evaporating the ether is treated with dilute acetic acid, which separates a dark brown smeary mass, and the perfectly clear filtered solution is mixed with excess of caustic soda and shaken out with ether.

The hygrine left on evaporating the ether solution obtained in the

last operation is a yellowish oily substance of peculiar odor, somewhat suggestive of that of chinoline; it has a strong alkaline reaction upon red litmus paper, does not alter phenolphthalein, has a slight burning taste, dissolves readily in ether, chloroform, or alcohol, but little in water or caustic soda solution, and forms a crystallizable salt with hydrochloric acid. A water solution of the hydrochlorate becomes milky on addition of caustic soda, owing to the separation of the base in minute oily globules which aggregate after a time. The base forms with oxalic acid a salt crystallizing in small needles. The platinum salt is also crystallizable.

The fluorescence of solutions of hygrine in dilute acid is a marked character, but it becomes apparent only on dilution with water, and is not recognizable when the solutions are concentrated. The fluorescence is also destroyed by other substances, such, for instance, as sodium chloride.

Hygrine volatilizes with water vapor, and at a higher temperature it may be distilled alone. The quantity at my disposal was too small to admit of a determination of the precise boiling point. To ascertain the composition of the base the platinum salt was analyzed and found to give—

						Calculated.
Pt.....	24.51	25.02	24.25	2.25	24.18	24.71
C.....	—	36.59	—	—	36.80	36.59
H.....	—	4.05	—	—	3.94	3.55
Water of crystallization..	4.73	4.51	4.35	5.15	—	4.57

These data lead to the formula $(C_{12}H_{13}N)_2PtCl_6 \cdot H_2 + 2H_2O$, and show that hygrine is a homologue of chinoline, C_9H_7N , having the same composition as tetrahirolene of Greville Williams, but whether or not it be identical with that substance must be left for further inquiry to determine.

Wöhler and Lossen state that the substance to which they gave the name of hygrine had a distinct smell of trimethylamine, and several other observers have repeatedly remarked the odor of that base in the preparation of cocaine. It is therefore very possible that hygrine may be really trimethylchinoline, and that this base is convertible under certain conditions into trimethylamine and a non-nitrogenous substance, as is the case for example with dimethylpiperidine methylhydroxide. This, however, is only a speculation that must be submitted to the test of experiment.

AUSTRALIAN OPIUM.

By W. E. MATTHEWS.

The greater part of the colonial opium found in the Melbourne drug market comes from the Bacchus Marsh district, where the cultivation of the poppy has been carried on for the past eighteen or twenty years. The first supply of opium sent into the market from this district was in 1871, and scarcely a season has been missed since. Through the favor of Messrs. Pearce Bros., of Bacchus Marsh, Mr. Thomas Doubleday, of Coimadaí, who is the largest grower in the colony, has kindly supplied many interesting notes on the culture of the poppy and collection of the opium. The light loamy flats on river banks are most suited to the growth of the poppy, and it has been found advisable to sow at three distinct periods. About the first week in May, the second or third week in June, and the latter end of July are the best seasons for the purpose. By adopting this system of sowing the whole crop comes into readiness in rotation, and is consequently more easily managed.

Mr. Doubleday sows the seed in drills about twenty-two inches apart and half an inch deep. When the plants are two or three inches in height, cleaning and thinning is commenced, leaving the plants ten inches apart, giving from 28,000 to 29,000 plants to the acre, which, in an average crop, yields about 150,000 capsules; and as each capsule receives at least four incisions, and each incision has to be scraped once, a slight estimate may be formed as to the labor attached to an acre only. In moderately moist seasons the plants attain the height of seven feet and over, but this is no advantage to the grower, as it has been noticed by Mr. Doubleday that it not only renders the crop somewhat unmanageable, but also reduces the yield of opium. A crop averaging from three to five feet is by far the most productive and easily managed. An acre, in a good season, will yield from thirty to forty pounds of marketable opium, but from fifteen to twenty-five pounds is about the average product per acre in the Bacchus Marsh district, over thirty pounds being considered exceptionally good. The average yield on the Continent is twenty-five pounds; in India, in a good season, the yield is from thirty to forty pounds per acre. About four days after the flower opens the petals fall, and in another four days after (the time depending mainly on the state of weather) the capsule changes to a bluish-green. It is then sufficiently mature for

scarification. Two horizontal incisions are made, extending across one-half of the circumference. This is done in the evening, and the thin, milky juice (opium) that exudes during the night is scraped off early on the following morning, so as to finish gathering before the opium becomes hardened by the sun. Cold, showery weather is much against the grower, as the exuding juice, being thin, is easily washed off. Hot days and heavy dews at night increase the flow, and improve the consistency of the product. Two days after the first scarification the capsule is ready for incisions to be made on the opposite side. This is sometimes repeated till the capsule is thoroughly exhausted. The opium, when gathered, is made into balls from about half a pound to a pound in weight. These are dried in the shade, care being taken to turn them every second day to prevent mould, the length of time between the turnings being increased as the opium hardens.

A sample of that collected last season at Bacchus Marsh, assayed in accordance with the *British Pharmacopœia*, yielded 11.5 per cent. of morphine in the dry powdered opium. A small sample from Queensland gave 9.8 per cent. of morphine by the same process. An analysis of the Bacchus Marsh opium gave the following results:—morphine, 10.65; codeia, .55; narcotina, 6.48; narceine, 6.11; gummy matter, 26.70; mucus, 21.62; resin and oily matters, 6.80; water, 9.19; undetermined and loss, 11.90; total, 100.00. A batch of extractum opii, prepared from one pound of colonial opium, yielded a product of 9.3 ounces of a good extract of full alkaloidal strength.—*Austral. Jour. Pharm.*, Nov., 1887, p. 393.

RECENT RESEARCHES IN BOTANY.¹

By E. G. BAKER, F.L.S.

The state of botanical research in this country at the present time is in a decidedly encouraging condition. For a long time English botanists have taken a leading part in systematic botany; but in histological and physiological botany there has been a great lack of original work. Now it seems likely that this will be changed. A new school has arisen, and at the leading universities a regular course of practical work is annually given. Some

¹ Read at a meeting of the Chemists' Assistants' Association, October 20. Reprinted from *Phar. Jour. and Trans.*, November 5, 1887.

of you may have noticed as evidence of this activity the numerous works recently published.

An excellent work on practical botany by Bower and Vines will be found all that can be desired for laboratory work, while students of three or four years ago will remember having to rely on Sachs' "Botany" as an advanced text-book. The different parts which compose this work are now published separately with much amplification by the Clarendon Press, Oxford.

Only last month a new journal called *Annals of Botany* first saw the light, showing that the present publications were inadequate to meet the demand. It specially deals with physiological, morphological and histological botany, and the papers are copiously illustrated.

In saying a few words, then, on "Recent Researches in Botany," the difficulty is not want of material, but rather the reverse. I have endeavored, therefore, only to select such matter as may be of general interest.

First of all I would refer to some "Notes and Queries on Gentians," by Professor Huxley. It may, perhaps, surprise you to find Professor Huxley writing a botanical paper, but he has written a very valuable and interesting one, and which is well worth a little attention.

Having to spend some six weeks in Switzerland during August of last year, he was much attracted by the Alpine vegetation, and especially by the gentians; so much so, that not only did he examine the few species that grow wild there, but on returning home he devoted himself to a complete review of the whole natural order Gentianaceæ. At the time he was in Switzerland two species were principally in flower, and I was much struck by a statement he made, which was that if he gathered two or three specimens he found no difficulty in giving their names, but that if he gathered fifty, so great was their variation, that it was almost impossible to state definitely where one species began and the other ended. This I find to be one of the chief difficulties in systematic botany. In a great many natural orders the descriptions of the various species have to be drawn up so as to allow of a certain range of variation, and even then if you have a good supply of specimens you are nearly sure to find some one or two that act as connecting links between the species.

Professor Huxley has done for the gentians what he and other Darwinian zoölogists have done for many groups of animals. He has worked at them and endeavored to trace their relationship to one another, and to see how far they can be made to conform to one common type, just as he showed in a well-known paper that the horse, ass and zebra were all descended from a single common miocene ancestor.

After examining the flowers of a large number of the Gentianaceæ he found that nectaries were present, and that the nectarial surface was sometimes situated on the corolla and sometimes at the base of the ovary. This then formed the main point in his system of classification.

The natural order Gentianaceæ is well suited to a critical examination of this character, as it is a well-marked one, and its limits are fairly well defined. Arranging, on the one hand, the flowers of this natural order having nectaries on the corolla, and on the other those having nectaries at

the base of the ovary, Professor Huxley pointed out the lines along which the probable evolution of the Gentianaceæ have taken place, and also sketched a hypothetical ancestor.

It is interesting to note that this arrangement, which I think I may call a biological arrangement, differs materially from the ordinary arrangement, such as given, for instance, in Hooker and Bentham's "Genera Plantarum."

Passing now from a consideration of the structure of the "gentians," I would turn your attention to a certain abnormal phenomenon in the life history of a fern known as "apospory," whereby the usual life cycle is shortened. Professor Bower has shown that in the case of *Athyrium Filix-femina* var. *clarissima*, Jones, complete spore arrest occasionally takes place: the sporangia instead of developing spores develop into prothalli. In *Polystichum angulare* var. *pulcherrimum*, Padley, this phenomenon also takes place, and, furthermore, prothalli have been observed to develop from points on the frond away from the sori—in this case, then, the sporangium is also eliminated.

The phenomenon of apospory may be considered as a mere sport, but certainly a peculiar one, interfering, as it does, to such a large extent in the life history of the plant concerned.

A good deal of attention has lately been paid to the effect various chemicals have in stimulating and retarding growth in plant life.

At the recent meeting of the British Association in Manchester, Dr. Vines mentioned some experiments he had been making with the two alkaloids, atropine and physostigmine. Everybody here doubtless is acquainted with the action of these two bodies when used in eye operations, the one dilating the pupil of the eye, and the other causing contraction. They possess very marked properties—the one being exactly antagonistic to the other, so are well suited for experimentizing with. Their action was tried on the common sensitive plant (*Mimosa pudica*), and it is interesting to note that, as in the case of animal tissues, the result obtained was stimulation of the vegetable cell in the one case, and contraction in the other.

This effect of stimulating vegetable growth has been the subject of a series of experiments conducted at Cambridge by Anna Bateson and Francis Darwin. If the turgescient pith from a growing shoot is freed from the external tissues, it exhibits a sudden increase in length. It also exhibits increase in length if placed in damp air or water.

This latter fact, and the possibility of accelerating and retarding the rate of increase in length by various reagents, was made the point of a number of careful observations.

The pith, obtained either from the Jerusalem artichoke (*Helianthus tuberosus*) or sunflower (*H. annuus*), was attached to the bottom of a narrow glass jar, the upper end being connected by means of a thread of plaited silk with the short arm of an auxanometer-lever in order that any increase in length might be accurately measured.

If a strip of pith is filled up as here described and the jar is then filled with water, the elongation as exhibited by the descent of the long arm of

the lever is most striking; indeed, so rapid is its movement, that it travels in many cases over ten millimetres in one minute.

The stimulating effect of alcohol was first tried. Methylated spirit 2 per cent. being used, the acceleration was 100 : 150.¹

The stimulating effect of ether vapor was then tried, the pith in these experiments being allowed to grow in damp air. A known quantity of ether was poured into a jar of known capacity. The mouth of the cylinder was closed by a divided glass disk which allowed the passage of the thread attaching the pith to the lever.

The atmosphere of ether was kept as constant in strength as was possible. The following table shows the percentage of ether in the atmospheres which caused acceleration, the amount of quickening being given in a parallel column.

Percentage of ether.	Acceleration of growth.
0.27°	100 : 118
0.37°	100 : 146
0.40°	100 : 200

With chloroform the results were—

Per cent.	
0.008.....	Retardation of growth.
0.05	No effect.
0.1.....	No effect.
0.9.....	Slow contraction.

An aqueous solution of camphor, said to be 0.1 per cent., was tried, but no effect on the "growth" of the pith was observed.

Weak solutions of ammonia were found to have a well-marked stimulating effect.

Strength of solution.	Amount of acceleration.
0.5	100 : 145
1.9	100 : 108
2.0	No effect.
2.2	100 : 121
2.4	100 : 129

Various acids were tried. As a rule they had no accelerating effect on growth, but caused either retardation or actual contraction of the pith.

Acetic acid and hydrochloric acid caused decided retardation. The effect of nitric acid was not very evident.

Carbolic acid of .5 per cent. and 1 per cent. did not seem to have any effect, but 3 per cent. caused a contraction of the pith.

The effect of prussic acid was very striking. It did not produce a contraction, as might have been expected, but either a temporary acceleration or else a remarkably steady high rate of growth continued for a prolonged period.

¹ One hundred represents a definite amount of acceleration, i. e., increase in length at the rate of 0.46 million per minute.

The effect of quinine was tried, aqueous solutions of quinine chloride being used, ranging between '15 per cent. and '34 per cent.

The result was retardation, followed in a few minutes by contraction and death.

These results appear to me particularly interesting. I do not wish to comment on them further than just to draw your attention to the last two cases, where it will be remembered that while hydrocyanic acid caused acceleration the effect of quinine was contraction and death.

Before concluding, I should just like to say a few words on some of the work that takes place at Kew. Very few of those who take a casual stroll through the gardens or greenhouses have any idea of the work that is done, so to speak, behind the scenes. Kew Gardens act as a sort of nursery for any vegetable economic product that may be found. The plant is there-grown and propagated, and when the time arrives distributed anywhere among our colonies where it will grow.

Thirty years ago it was cinchona that was being taken in hand—to-day it is plants like the coca plant (*Erythrozydon Coca*). The effect in the former case is apparent to all who have watched the price of quinine for the last few years; the effect in the latter case remains yet to be seen.

One of the most recent arrivals at the Gardens is a packet of *Gymnema*, the plant that is said to take away the power of taste; whether this will prove to be worth growing and propagating must also be left as yet unsettled.

There are many plants which will shortly have to be taken in hand, as the extermination of the wild stock is proceeding at a rapid rate. Foremost among these may be mentioned india-rubber. The supply of this article is obtained from uncultivated material, but this is rapidly being exhausted, and needs replenishing. It is work of this character that the authorities at Kew undertake to superintend and carry out to the best effect. Surely this judicious distribution of economic products is botanical research of a very practical kind.

Before leaving the subject of Kew Gardens, I would remind any student who may be here that there is a part of the Gardens that is now set aside specially for their benefit. Here the plants will be found arranged in beds and classified according to their natural orders, and anyone so wishing is allowed to pick and dissect the various flowers that will be found there. Whether the student's object be to do a little botanical research on his own account, or shall I say only to get up the characters of the orders for an examination, everything will be found suited to his requirements.

There are many more points that might have been discussed as being recent researches of a botanical character. The "Present Aspect of the Cell Question" affords material for a paper all to itself. The phenomenon of "Karyoikinesis," or method of division of the cell nucleus, has only comparatively recently been thoroughly investigated. Then we have what is called "Continuity of the Protoplasm." Walter Gardiner and others have shown that in certain cases thin threads connect the protoplasm in adjacent cells, and that these threads can be made clearly visible by staining them with some suitable medium.

I have treated shortly of one group of cryptogams, but comparatively recently another of the groups of that division of the vegetable kingdom has been the subject of research, I refer to the Lycopodiums, or club mosses. Professor Treub, of the Buitenzorg Botanical Gardens, has filled in one or two phases of the life-cycle of these plants, having found their prothalli and traced the development of the same.

All this will show you that at present botany is not standing still, but that there are earnest workers doing good work.

USTILAGO MAYDIS.

By W. A. N. DORLAND, M.D.

After briefly reviewing the history of cornsmut, the author relates his observations in nine cases in which the drug was employed, and then continues:

The above comprises all of the cases within the three months in which it was deemed necessary to employ the drug to shorten the duration of labor. Before proceeding, it may be as well to state that the patients were all in good physical condition, that all were at term, and that all made a rapid and complete recovery.

Having, now, this record before us, let us endeavor by a careful examination of the cases, to group the results of our experiments, that we may the more clearly ascertain the value of the drug. Three or four points seem to stand out prominently, demanding our consideration.

1. *The toxicology and physiological action of the drug.*

No cases of poisoning in man by the drug are on record. That it is, however, possessed of toxic properties in large doses has been proved by Mitchell.¹ He found that in the lower animals, in large doses, it acted violently upon the spinal cord, paralyzing first the sensory, later the motor tracts, finally involving the motor, and probably also the sensory nerves. Like ergot, then, it is probable that the chief force of the drug, in toxic doses, is expended upon the nerve centres, producing a toxic paralysis.

As may be understood, our studies on the physiological action of *ustilago* were necessarily limited. After the administration of the drug in three instances, there was considerable nausea, followed in one case by vomiting of the *ustilago*, together with the other contents of the stomach. This nausea seems to be of a similar nature to that produced by the ergot of rye, and calls for no further discussion.

The action of *ustilago* upon the uterus has been more carefully noted. After the ingestion of a sufficient amount, in from twenty minutes to half an hour, the pains, if present, are increased in severity, in frequency, and in duration, presenting a marked *clonic* character, following each other in frequent succession, with a decided intermission between each. In this respect it differs decidedly from the action of ergot, which, in full doses, produces one continuous, *tonic* spasm of the uterine muscle. It is this property of ergot which has, when administered before the delivery of the placenta, produced in so many instances

¹ Dr. James Mitchell, Inaug. Thesis, Univ. of Pa., 1883.

the irregular contractions of the uterus, of which the hour-glass is a well-known example. The employment of ustilago seems to be entirely free from such unpleasant complications.

In addition to being a valuable adjuvant in stimulating weak uterine contractions, ustilago seems to possess the property, which some years ago was ascribed to quinine, namely, of exciting uterine pains when entirely suspended. This has been noticed by Leonard and others.

As to the time required for the action of the drug to become apparent, it may be said that it differs in different cases, depending, undoubtedly, upon the rapidity with which it is absorbed from the gastro-intestinal tract and carried into the system. In the above record, in only two instances, did it require over thirty-five minutes before the ustilago acted upon the uterine tissues, and in the latter case most of the drug was ejected by emesis. In the remaining seven cases the average time required was twenty-five minutes.

The effect produced by ustilago upon the other unstriped muscular tissues of the body has not been inquired into. Probably it produces the same increase of intestinal peristalsis, and the same rise in the arterial pressure due to vaso-motor spasm as is produced by ergot. This is yet open to investigation.

2. *The indications for the employment of the drug.*

It may be noticed that in all the above cases the ustilago was not administered until complete dilatation of the os had been accomplished. Whether or not a disastrous effect would be produced by the administration of the drug prior to the commencement of the second stage of labor cannot be stated. As yet, that question has not been decided. From the study of the physiological action of ustilago, we should think a danger of the irregular contractions of its compeer, the ergot of rye, would be precluded, and that if there were any possibilities of the exigencies of the case demanding its use, it might be employed with impunity during the first stage of labor. At present, however, we shall consider the first indication for its use to be the failure of the pains, with *complete dilatation of the os uteri*.

In none of the cases was the drug employed until the pains of labor had either become so weak that they were inefficient to accomplish the expulsion of the fœtus, or until they were entirely suspended. This, then, we consider the second indication for its use, namely, the *inefficiency or entire suspension of the parturient pain*.

After the ustilago had been taken, it may also be noticed that in no case was there the slightest tendency toward a post-partum hemorrhage. In each case after the expulsion of the placenta, the uterus remained in a state of firm contraction. While, during the three months the great majority of the remaining cases, in which the customary ergot had been employed, showed no tendency whatever toward this alarming accident, however, in two instances was there such an occurrence demanding prompt attention. The third indication, then, for the employment of ustilago we shall consider to be a *condition of uterine inertia threatening or producing post-partum hemorrhage*.

3. *The dose and mode of administration.*

The preparation of ustilago employed in all reported cases, as well as in our own, was a good fluid extract. The dose of this varies from one-half to two drachms, one drachm being a fair average. This may be repeated at intervals

as required. Should it be necessary, it may be used hypodermatically in doses of from five to fifteen minims.

Finally. *The advantages of ustilago over ergot.*

Dr. Frank H. Potter in a paper on the "Proper Use of Ergot in Obstetrical Practice,"¹ closes his article with a series of ten conclusions. In these he states that when administered during labor the action of ergot is uncertain, producing irregular contractions, rigidity of the os, with interference of the placental circulation, or too rapid expulsion of the fœtus, jeopardizing the maternal tissues. He also asserts that the life of the child is endangered through absorption of the oil of ergot, and that indirectly the drug may prove a cause of puerperal septicæmia by preventing the removal of every portion of the placenta and membranes. His last conclusion is as follows: "The proper use of ergot in obstetrical practice is limited to those cases in which, after the expulsion of the placenta, the uterus refuses to contract, or having once contracted, shows a tendency to secondary relaxation. Even in these cases reliance should not be placed upon it alone, but its action should be supplemented by the other means used to provoke uterine contraction.

When compared to this formidable array of objections the employment of ustilago seems much to be preferred to that of ergot. It does not produce irregular contractions with all the consequent complications and sequelæ; containing but two and a half per cent. of fixed oil, while ergot contains from twenty-five per cent. to twenty-eight per cent., the dangers of absorption are reduced to a minimum; and, finally, as it can be procured at a cost of fifty per cent. less than that of ergot, it seems to be on a fair highway toward the supplanting of the latter in obstetrical practice, should the results of the investigations thus far be confirmed by subsequent researches.—*Med. News*, Nov. 5, 1887.

PHILADELPHIA HOSPITAL.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, December 20, 1887.

The third of the present series of pharmaceutical meetings was held this day, Mr. William B. Webb in the chair. The report of the Survey of the Inter-oceanic Canal Route in Nicaragua; the report of the Bureau of Ethnology; the report of Education in Alaska; and several public documents issued by the Treasury Department, were reported as having been received for the library since the last meeting, from the Honorable M. S. Quay, United States Senator from Pennsylvania.

Mr. McIntyre presented a *bottle* of the old style, such as formerly graced the shelves of the apothecary stores, which he thought might fittingly find a place in the cabinet of antiquities.

A series of official *tinctures* were presented by Messrs. Bullock & Crenshaw to the cabinet. The chairman said he thought it quite desirable that a set of these preparations, made strictly according to the Pharmacopœia, should be in the museum.

Messrs. Johnson & Johnson presented specimens of *rubber* and *rubber plaster*

¹ Buffalo Med. and Surg. Journ., Sept. 1886, quoted in Therapeutic Gaz., Nov. 15, 1886.

masses, such as are used in the preparation of the plasters now so largely sold.

On motion, the thanks of the College were tendered to the givers for their kind remembrances.

Mr. H. J. M. Schröter read a paper upon *Bitter Wine of Iron*. In response to a query whether the articles examined were those largely advertised, or those generally made by different pharmacists for their own sales, the reply was that the most advertised ones were not those examined. Bitter wine of iron had long been made before it was admitted in the Pharmacopœia. One member thought it originated with the senior Dr. Meigs; another, however, stated that Dr. Physic, or the elder Dr. Parrish, had prescribed it and given a formula for it.

A paper upon *Fluid Extract of Cimicifuga* was read by Mr. E. C. Leshner, who also exhibited the results of his experiments; and a paper upon *Fluid Extract of Asarum Canadense* was read by Mr. Frank P. Streeper. The papers were referred to the Committee on Publication. One of the members inquired whether the samples submitted had been filtered, and the reply was, that only one had been, the others retained their bright condition without any treatment.

Mr. Thompson thought this a proper occasion to have a general expression of opinion upon the subject, and said that every student should comprehend the importance of making his own pharmaceuticals; that they came here to obtain an education that fitted them to do so, and that it ought to be their aim and pleasure, as it is their profit, to do it. Mr. McIntyre said that the persons requiring medicines could be divided into two classes: those who got them of the doctors, and those who obtained them from apothecaries. Every druggist could prepare fluid extracts of the strength of half an ounce of drug to the fluid-ounce, and it was desirable that they so should be prepared; this would help both patient and apothecary. Mr. Thompson wished to hear Mr. Robbins express his opinion on this subject, as he had a very large experience in this matter. Mr. Webb inquired whether Mr. Robbins thought that a light drug, such as buchu or senna, could be exhausted with a quantity of liquid equal to the weight of the drug used. Mr. Robbins said that the drugs just named doubtless could be exhausted. The opinion had been expressed heretofore that fluid extracts would be better made if prepared so that a fluidounce represented but half an ounce weight.

Mr. McIntyre showed specimens of blue and white *wrapping paper* of a character that would repel moisture, being thus better adapted to the use of putting up Seidlitz powders, and other substances of a hygroscopic character; the paper is that commonly known as parchment paper.

Mr. Thompson read a facetious article, an "Epitaph on a Chymist," taken from a publication dated about 1800.

A member said that as the question of the revision of the Pharmacopœia was approaching, it would be desirable to ascertain the opinion of the members of the College upon the subject of parts by weight; it would probably be found that a large majority were not in favor of it.

There being no further business the meeting adjourned.

T. S. WIEGAND
Registrar.

CLASSES

—OF THE—

PHILADELPHIA COLLEGE OF PHARMACY,

SIXTY-SEVENTH ANNUAL SESSION, 1887-1888.

JUNIOR CLASS.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Allen, John Maskill,	Salem,	N. J.	James T. Shinn, Ph.G.
Amsden, William Cummings,	Manchester,	Iowa	L. Atwater & Son.
Anhalt, Herman,	Brooklyn,	N. Y.	Boericke & Tafel.
Arny, Harry Vin,	New Orleans,	La.	F. C. Godbold.
Aubley, Samuel,	Scottsdale,	Pa.	J. M. McNeil.
Ayers, William Bishop,	Salisbury,	Md.	
Baird, John,	Philadelphia,	Pa.	Horace B. Taylor.
Barlemont, Phillip Louis,	Camden,	N. J.	J. Ames Lewis.
Barnitz, Lincoln Gray,	Catawissa,	Pa.	George W. Roland.
Bateman, Wm. Henry Stevens,	Mahanoy City,	Pa.	Thomas Lewis Jr., M.D.
Baur, Jr., William Christopher,	St. Clair,	Pa.	S. E. Walker.
Bender, John Jacob,	Shippensburg,	Pa.	J. C. Altick & Co.
Berkemeyer, Francis Molton,	Kutztown,	Pa.	Harrison Duffield, M.D.
Berkstresser, Watson J.,	Huntington,	Pa.	J. H. Black & Co.
Bickel, Harry Lee,	Felton,	Del.	M. M. Stevenson.
Bilheimer, John Jessiah,	Bath,	Pa.	Dr. G. P. Kern & Son.
Bissell, John Robertson,	Mahanoy City,	Pa.	C. D. S. Fruh, Ph. G. M.D.
Blake, Duncan Williamson,	Gloucester City,	N. J.	Dr. D. W. Blake.
Boger, Charles Everett,	Lebanon,	Pa.	
Bolton, Joseph Peeky,	Philada.,	Pa.	Wm. Conner, Ph. G.
Bowman, D. Buchanan,	Lancaster,	Pa.	Wm. G. Baker.
Boyer, Allen,	Allentown,	Pa.	W. E. Moyer.
Bradley, Augustus,	Tarboro,	N. C.	W. H. Macnair.
Bradley, Henry Joseph,	Philada.,	Pa.	J. F. Hayes, Ph. G.
Brennan, John Thomas,	Philada.,	Pa.	Cruise & Farrelly.
Brick, Harry Walter,	Philada.,	Pa.	Bullock & Crenshaw.
Bright, William Willets,	Muncy,	Pa.	G. F. Hart.
Brown, Barton L.,	Pleasant Grove,	Pa.	J. Harry Love, Ph. G.
Brown, Charles,	Philada.,	Pa.	Kennedy & Lyman.
Brown, Walter Lee,	Camden,	N. J.	Albert P. Brown, Ph. G.
Buckner, John Armstrong,	Pleasant Hill,	Mo.	F. T. Buckner, M. D.
Burget, Harry Edward,	Terre Haute,	Ind.	W. C. Buntin.
Butterworth, Francis James,	Lenni,	Pa.	Chas. L. Lashelle.
Cadmus, Alfred Brooks,	Philada.,	Pa.	Bullock & Crenshaw.
Caldwell Florence, Moore,	Philada.,	Pa.	Dr. S. W. Caldwell.
Campbell, Clarence Henry	Easton,	Md.	Milton Campbell.
Carney, George Elmer,	Philada.,	Pa.	Hance Bros. & White.
Caritte, Clarence Edgar,	St. Paul,	Minn.	J. P. Caritte.
Cartwright, Benjamin Franklin,	Philada.,	Pa.	Dr. Wm. Delker.
Cassey, Henry English,	Philada.,	Pa.	Bullock & Crenshaw.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Cassaday, Frank Valorus,	Alliance,	Ohio	A. S. Cassaday.
Cassidy, John,	Philada.,	Pa.	W. H. Pile & Sons.
Cheney, William Lafayette,	Winchester,	Ind.	Dr. J. M. Carver.
Christman, Albert,	Allentown,	Pa.	E. J. Danowsky.
Clabaugh, Edgar Michael,	Altoona,	Pa.	D. G. Hurley, Ph. G.
Clapham, Benson Grant,	Mifflinburg,	Pa.	Charles Clapham.
Clarke, E. Edwin,	Bradford,	Pa.	Thompson & Wood.
Clavin, James,	San Antonio,	Texas	Wm. Robert Clavin.
Clewell, William Henry,	Holmesburg,	Philada.	Fred. C. Orth, Ph. G.
Cline, John Halliday,	Middleport,	Ohio	E. Davis & Co.
Codville, Henry Lawson,	Philada.,	Pa.	C. D. E. Ball.
Coll, Thomas,	Philada.,	Pa.	Bullock & Crenshaw.
Collings, Walter Nagle,	Philada.,	Pa.	D. W. Flemming.
Cooling, Benoni,	Charlestown,	Md.	J. S. Beetem, Ph. G.
Cooper, Percival Valentine,	Media,	Pa.	W. E. Dickeson.
Copeland, Harry Thompson,	Paterson,	Pa.	W. H. Banks & Co.
Cottam, Charles Marquis,	Beaver Falls,	Pa.	J. Fajans.
Cotton, Frank Wilbert,	Bordentown,	N. J.	George M. Carslake.
Craig, George Tindall,	Wilmington,	Del.	Z. James Belt.
Crane, William Howard,	Philada.,	Pa.	A. R. Finck, M.D.
Crawford, Archie Darrah,	Norristown,	Pa.	William Stahler.
Crawford, Walter Beatty,	Chambersburg,	Pa.	Cressler & Greenawalt.
Cunningham, George Adams,	Selma,	Ala.	Cawthon & Coleman.
Dalton, Joseph Edwin,	Upland,	Pa. F.	E. Himmelwright, M.D.
Daniels, Willaim Joseph,	Pueblo,	Col.	A. E. Daniels.
Davis, Pierre Beaumont,	Gainesville,	Texas	Chas. Shivers.
Day, Frederick Samuel,	Philada.,	Pa.	Warrington & Pennypacker.
Deitz, George Arthur, Jr.,	Chambersburg,	Pa.	Wm. L. Cliffe.
De La Cour, Joseph Carl,	Camden,	N. J.	J. C. De La Cour.
DeLester, Ferdinand Raymond,	Koenigsberg,	Germ'y	Henry Cox, Ph. G.
Derbyshire, Alexander James,	Laurel,	Ind.	G. B. Evans, Ph. G.
Devine, Oliver Crawford,	Philada.,	Pa.	Dr. McVicker.
Dietz, Charles James,	Philada.,	Pa.	F. W. E. Stedem, Ph. G.
Dorman, William Albert,	Hartleton,	Pa.	M. L. Mench, M.D.
Drake, Arthur,	Higginsport,	Ohio	Dr. H. S. Guthrie.
Du Bois, Samuel Conier,	Philada.,	Pa.	J. R. Elfrefth.
Eft, Frederick,	Palatine,	N. J.	Dr. C. G. Frowert.
Eldredge, Clarence Selby,	W. Cape May,	N. J.	Drs. Marey & Mecray.
Eldridge, Clarence Lewis,	Camden,	N. J.	French, Richards & Co.
Enders, William James,	Harrisburg,	Pa.	Fred. Rapp, Ph. G.
Engelman, Henry Schaeffer,	Cherry Hill,	Pa.	Weaver & Hohl.
Ensminger, Sam'l Chas, Deeg,,	Philada.,	Pa.	A. F. Gerhard, Ph. G.
Faries, Joseph Benjamin,	Smryna,	Del.	S. P. Wright, Ph. G.
Fehr, George W.,	Landingville,	Pa.	Albert Cable.
Feldt, George David,	Hagerstown,	Md.	Blew & Lucas.
Fiet, Harry Jacob,	Philada.,	Pa.	P. G. Weber.
Finkeni, William Casper,	Camden,	N. J.	G. W. Henry, Ph. G.
Fisher, George Frank,	Altoona,	Pa.	C. B. Baumgardner.
Fite Thomas Duncan, Jr.,	Nashville,	Tenn.	
Fleming, Lizzie,	Ayr,	Neb.	A. H. Keller, Ph. G., M.D
Foulkes, Stephen Harvey,	Terre Haute,	Ind.	J. F. Gulick,
Fraunfelder, Richard Deily,	Easton,	Pa.	Dr. T. H. Reaser.
Freeman, Clayton Lewis,	Freemansburg,	Pa.	O. J. Freeman, Ph. G.
French, Francis Freas,	Philada.,	Pa.	W. H. Koons, Ph. G.
Friezzell, George F.,	Henry Clay,	Del.	E. T. Dilworth.
Frontz, Edward Elmer,	Hughesville,	Pa.	A. B. Wenrich, Ph. G.
Galbraith, Frank Melton,	Chester,	S. C.	Dr. A. H. DaVega.
Gano, Frank Creamer,	Trenton,	N. J.	W. H. Mickle.
Ganster, William Foster,	Reading,	Pa.	F. X. Wolf.
Gerheart, William Henry,	Philada.,	Pa.	J. J. Ottinger, Ph. G.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Geilfuss, Alfred Victor,	Philada.,	Pa.	F. F. Williams, Ph. G.
Gerlach, Gustave,	Philada.,	Pa.	C. M. Edwards, Ph. G.
Glenk, Robert,	Philada.,	Pa.	Julius Israel.
Goll, Philip,	Wiltensee,	Germ'y	W. J. Schaeffer.
Gottwerth, William Lewis,	Wilmington,	Del.	T. B. Cartmell.
Gould, Harry Zinn,	Lebanon,	Pa.	S. A. Haverstick.
Gracey, Archibald Alexander,	Philada.,	Pa.	J. E. Loughlin.
Greenfield, Lewis Thompson,	Carlisle,	Pa.	H. C. Blairs' Sons.
Griffin, Howard Ezra,	Scranton,	Pa.	Charles Henwood.
Guthrie, Clinton,	Wilkesbarre,	Pa.	W. D. White.
Hablison, Walter Crawford,	Philada.,	Pa.	Wiley & Harris.
Hackney, George Wiley,	Uniontown,	Pa.	H. S. Clark.
Haines, Amos Henry,	Baltimore,	Md.	Dr. W. A. Davis.
Hall, Marlborough,	Philada.,	Pa.	Charles Ouram, Ph. G.
Hall, Walter Howell,	Wheeling,	W. Va.	Alex. T. Young.
Hance, Edward Hance, Jr.,	Germantown,	Pa.	Hance Bros. & White.
Handler, William,	Cleveland,	Ohio	Henry Mueller, M. D.
Harpel, Luther Grant,	Lebanon,	Pa.	J. L. Lemberger, Ph. G.
Hatcher, Robert Anthony,	New Orleans,	La.	J. L. Lyons & Co.
Haupt, William Grant,	Hartleton,	Pa.	H. C. Blairs' Sons.
Hause, George Shearer,	York,	Pa.	Dr. N. H. Shearer & Co.
Hieges, William Smith,	York,	Pa.	Wm. Smith & Co.
Henry, Samuel Clements,	Washington,	D. C.	J. W. Ridpath, Ph. G.
Hertel, Frederick Gustave,	Nashville,	Ills.	Aschenbach & Miller.
Heyner, Edward George,	Cleveland,	Ohio	E. H. Evans.
Hickman, Thomas Elwood,	Lombard,	Md.	W. H. Hickman, M.D.
Hoffecker, Robt. Crockett,	Dover,	Del.	T. C. Tomlinson.
Hoffman, Erdman,	Leipsic,	Del.	J. M. Wert, M. D.
Horning, John,	Bethlehem,	Pa.	Walt. Crawford, Ph. G.
Hostetter, Andrew Greider,	Florin,	Pa.	John E. Groff.
Houghton, John Almer,	Salt Lake City,	Utah	J. F. Allen.
Howard, Carrie Emily, Mrs.,	Philada.,	Pa.	H. B. Snively, Ph. G.
Howell, Samuel Emerson,	Camden,	Del.	C. E. Downes, M. D.
Hughes, Charles Collin,	Gulf Mills,	Pa.	F. H. Poley.
Hughes, Frank Stackner,	Bridgeport,	Pa.	James G. Wells, Ph. G.
Humason, Ivan,	Portland,	Oregon	W. M. Wisdom.
Jager, Charles Mathias,	Madison,	Ind.	Joseph S. De Loste.
James, Henry Hughes,	Wyoming,	Pa.	E. Wilson.
Jones, Will Lincoln,	Catasauqua,	Pa.	Wm. Heckenberger.
Kantner, Harry Baker,	Altoona,	Pa.	D. W. Levy.
Kappes, Jacob J.,	Zanesville,	Ohio	Hatton Bros.
Keller, Augustus Herman,	Philada.,	Pa.	A. G. Keller, Ph. G.
Kelly, John P.,	Elmira,	N. Y.	A. H. Baker, M. D.
Kendig, Allen Jesse,	Philada.,	Pa.	R. P. Marshall & Co.
Kennedy, Harry Milton,	Cape May,	N. J.	Dr. H. A. Kennedy.
Kern, Franklin,	Slatington,	Pa.	F. R. Pershing.
Kiger, Harry Stiles,	Wilmington,	Del.	H. C. Lintner.
Kilgus, John Frank,	Renovo,	Pa.	M. L. Clay.
Kilgus, William Michael,	Renovo,	Pa.	E. T. Swain.
Kingston, Charlie Davis,	Granby,	Mo.	Powers & Benton.
Kleinsteeber, William George,	Wilmington,	Del.	Emil Hertel, M. D.
Klopp, Henry Leinbach,	West Leesport,	Pa.	Sam'l H. Shingle, Ph. G.
Knowles, George Alexander,	Philada.,	Pa.	W. D. Kerr.
Krauss, Gustav Adolf,	Bremen,	Germ'y	Walt H. Smith, Ph. G.
Latin, Adolph,	Dayton,	Ohio	George Latin, Ph. G.
Leigh, Charles Neal,	Coxsackie,	N. Y.	H. C. Manlove, Ph. G.
Leine, Arthur Morris,	Honesdale,	Pa.	N. G. Ritter, Ph. G.
Leshner, John Becker,	Shoemakersv'e,	Pa.	E. W. Sharp.
Lingle, Milton David,	West Hanover,	Pa.	Dr. W. C. Kline.
Lonsaway, Albert Russel,	Tiffin,	Ohio	Howard G. Shinn, Ph. G.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Loveland, Prescott Raymond,	Mt. Holly,	N. J.	Geo. M. Smyser, Ph. G.
Lowenberg, Joseph,	Bloomsburg,	Pa.	N. J. Hendershott.
Ludlam, Paul Thomas,	Millville,	N. J.	Mulford Ludlam.
Luff, J. Homer,	Felton,	Del.	J. S. Beeten, Ph. G.
Lutz, William Dellet,	Germantown,	Pa.	L. A. Treichler.
Mack, John Sanford,	Slatington,	Pa.	J. E. Williams.
Macon, Gideon Hunt,	Warrenton,	N. C.	Frank P. Hunter.
Mayers, Henry John,	Wheeling,	W. Va.	Will W. Irwin.
MacMillan, John Charles,	Latrobe,	Pa.	Wm. Fetter.
McClellan, Howard,	Cambridge,	N. Y.	H. G. South.
McCloskey, Charles Edward,	Knoxville,	Pa.	F. L. Gilbert.
McClure, Joseph Elmer,	Youngstown,	Ohio.	Folsom & Thayer.
McCorkle, William,	Oxford,	Pa.	Horace Moll & Co.
McCouch, Samuel Emlen,	Malvern,	Pa.	George R. Walton.
McFadden, Robert,	Philada.,	Pa.	Lewis F. Segrest, Ph. G.
McKee, Joseph Allen,	Altoona,	Pa.	Alton Clabaugh, Ph. G.
McKeel, Charles Baynor,	Washington,	N. C.	J. McDonald, M.D.
McKnight, Joseph Irwin.	Pittsburgh,	Pa.	H. G. Peters.
McManus, Joseph,	Philada.,	Pa.	F. G. Ryan, Ph. G.
McVay, James Patrick,	Philada.,	Pa.	Frank E. Morgan, Ph. G.
McWilliams, Samuel,	Jennersville,	Pa.	T. L. Buckman, Ph. G.
Medara, Thomas Joseph,	Philada.,	Pa.	H. B. Taylor, Ph. G.
Meredith, Charles Clyde,	Palatine,	W. Va.	A. W. Taylor, M.D.
Merkel, William,	Minersville, Pa.,	John M.	Bradford, Ph. G., M.D.
Miller, Charles Borden,	Goldsboro,	N. C.,	Miller & Shannon.
Miller Solomon,	Hagerstown,	Md. S.	E. R. Hassinger, Ph. G.
Mittelbach, Henry,	Booneville,	Mo.	William Mittlebach.
Mohn, John Ellsworth,	Centreville,	Pa.	J. W. Sampsell, M. D.
Moody, Willie Bossieux,	Richmond,	Va.	W. L. Moody.
Morgan, George Irving,	Lynn,	Mass.	F. E. Morgan, Ph. G.
Morris, Joseph Garrison,	Seaville,	N. J.	Edward W. Sharp.
Morris, Wm. Henry,	Philada.,	Pa.	Geo. Holland, M.D.
Moyer, Reuben Emanuel,	Robisonia,	Pa.	Zeigler & Smith.
Murray, Emmett Leroy,	Americus,	Ga.	J. A. & D. F. Davenport.
Murray, James Joseph,	Reading,	Pa.	J. H. Stein, Ph. G.
Mustard, John, Jr.,	Smyrna,	Del.	J. W. Denney.
Neville, William,	Conshohocken,	Pa.	James W. Harry.
Newton, Alexander Bunyun,	Germantown,	Pa.	John Leedom Kooker.
Nichols, John Baugh,	Philada.,	Pa.	W. R. Warner & Co.
Nyce, Howard Markley,	Worcester,	Pa.	G. B. Evans.
Orr, James Carson,	Philada.,	Pa.	George Holland, M. D.
Osmun, Milton Mackey,	Delaware,	N. J.	W. S. Freeman, Ph. G.
Owens, Harold Duche,	Philada.,	Pa.	D. Marshall & Bro.
Owings, Osmond Young,	Winsboro,	S. C.	Chas. Shivers.
Palmer, Charles Walter,	Frenchtown,	N. J.	A. P. Williams.
Paules, William Rumbaugh,	Marietta,	Pa.	Dr. S. Y. Thompson.
Pentz, John Fleming,	Easton,	Pa.	C. E. Spenceley.
Peters, George Fegley,	Mauch Chunk,	Pa.	Jos. Lacier.
Pettit, Paris Chapman,	Elmira,	N. Y.	C. P. Pettit.
Pfeiffer, Charles Alfred,	Frederick,	Md.	J. H. Evans.
Porter, M. Arthur,	Canton,	Pa.	Mix & Whitman.
Potts, George Clinton,	Harrisburg,	Pa.	Dr. Weills.
Powell, Benajah Butcher,	Mount Holly,	N. J.	Henry Thornton, Ph. G.
Purnell, Howard Garrett,	Georgetown,	Del.	A. W. Duvall, M. D.
Quackenbush, Fred Briggs,	Penn Yan,	N. Y.	W. W. Quackenbush.
Ramsay, Charles Carroll,	Floyd,	Iowa	J. Ellis, M. D.
Ray, George Herbert,	Portland,	Oregon	Plummer & Byerley.
Read, Ralph Maynard,	Osceola Mills,	Pa.	F. R. Read.
Reading, Joel Salter,	Lambertville,	N. J.	G. P. Scheehle, Ph. G.
Reese, Victor Beaumont,	Renovo,	Pa.	Howard Knight, Ph. G.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Reider, Edwin Stanton,	Williamsport,	Pa.	Duble & Cornell.
Reynolds, May,	Philada.,	Pa.	Susan Hayhurst, M. D.
Rhoads, Harry Paist,	Doylestown,	Pa.	T. E. Conard, M. D.
Richards, Davis Bruce,	Philada.,	Pa.	Wm. Weber, Ph. G.
Ridgway, Charles Alexander,	Hydettown,	Pa.	John H. Kerr.
Riggs, Sherman Merrill,	Decatur,	Ills.	Henry Smith.
Risley, Leon Stewart,	Manchester,	Conn.	W. A. Lowry.
Rolleston, Arthur Raymond,	Philada.,	Pa.	Harry Cox.
Roth, Samuel George Jeremiah,	Laurys,	Pa.	A. A. G. Stark, Ph. G.
Rudy, Jacob Albert,	York,	Pa.	Dr. C. B. Lowe, Ph. G.
Rutherford, Frank Park,	Cochranville,	Pa.	L. E. Sayre & Co.
Schetky, Lawrence Oliphant,	Mt. Holly,	N. J.	Bullock & Crenshaw.
Schlegel, Emil Julius,	Philada.,	Pa.	Ernest Schlegel.
Schloer, Charles Albert,	New York,	N. Y.	W. D. Stevenson.
Schminky, Allen Beecher,	Lykens,	Pa.	A. G. Stanley.
Schutzenbach, Augustus,	Harrisburg,	Pa.	C. M. Forney, Ph. G.
Schwab, Leslie Watts,	Decatur,	Ills.	A. J. Blaine.
Schwacke, Charles Albert,	Charlestown,	S. C.	August H. Schwacke.
Schwenk, William Henry,	Peoria,	Ills.	R. D. McDougal.
Scott, Theodore William,	Oak Hill,	Pa.	Chas. H. Clark.
Shreve, Joseph Frith,	Jacksonville,	Ills.	James Williams.
Sitgreaves, Wesley Cline,	Vincetown,	N. J.	F. Saunderson.
Small, John Hamilton,	York,	Pa.	Henry C. Blair's Sons.
Smith, Frederick William,	Loudonville,	Ohio	D. F. Shull & Co.
Smith, George Anselm,	Nazareth,	Pa.	Babp & Crawford.
Smith, Harry C.,	Millville,	N. J.	W. H. Smith, M.D.
Smith, Harry Lawrence,	Philada.,	Pa.	Dr. A. N. Tomlin.
Smoker, Howard Grant,	Columbia,	Pa.	P. S. Brugh.
Southerland, Thomas Raibe,	Wilmington,	N. C.	J. H. Hardin.
Sprissler, C.,	Philada.,	Pa.	Theo. Sprissler, Ph. G.
Stackhouse, Clifton Taylor,	Philada.,	Pa.	Oliver J. Freeman.
Steele, George Elmer,	Youngstown,	Pa.	A. J. Kells.
Stephen, Willie Leisse,	Reading,	Pa.	John B. Raser, Ph. G.
Stoever, Harry Van Hoff,	Chester,	Pa.	J. M. Stoever, Ph. G.
Tafel, Adolph Leonard,	Philada.,	Pa.	Boericke & Tafel.
Thomas, Harry Wyche,	Valdosta,	Ga.	Dr. Thomas.
Thompson, Ebenezer Francis,	Titusville,	Pa.	E. K. Thompson.
Upham, Samuel W.,	Bath,	N. Y.	J. Dunn.
VanValzah, John Adams,	Watsonstown,	Pa.,	W. D. Heiser.
Visanska, Samuel Albert,	Abbeville,	S. C.	Givin & Co.
Vogelsang, Charles F. L.	South Oil City,	Pa.	W. J. Pechin.
Wagaman, Samuel Edward,	Chambersburg,	Pa.	J. S. Nixon & Son.
Watkins, Edward Howell,	Girardville,	Pa.	G. W. Storie.
Weaber, Charles Henry,	Fredericksburg,	Pa.	Dr. M. T. Reeder.
Weil Joseph L.,	Reading,	Pa.	Jas C. Sanderson.
Weiser, Walter Rupert,	York,	Pa.	D. F. Shull & Co.
Wells, Frederick Barton,	Vineland,	N. J.	Dr. S. W. Gadd.
Westphal, Herman,	Hamburg,	Germ'y	Francis J. Kock.
White, Ishmael James,	Baltimore,	Md.	C. A. Lang.
Williams, Harry,	Laurel,	Del.	S. L. Kenny.
Williams, Solomon Cohen,	Charleston,	S. C.	A. R. Finck, M.D.
Williamson, James Strickler,	Harrisburg,	Pa.	Dr. Theodore Jacobs.
Wischman, Joseph Washington,	Philada.,	Pa.	Lewis Trupp, Ph. G.
Wishart, John Elmer,	Harrisonville,	Pa.	John B. Ferguson.
Witherow, John Howard,	Shippensburg,	Pa.	J. C. Altick & Co.
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Woertz, George Augustus,	Philada.,	Pa.	C. E. Hewitt, Ph. G.
Wolf, Frederick Joseph,	Philada.,	Pa.	R. Shoemaker & Co.
Wood, Harry Sudduth,	Maysville,	Ky.	James Shakelford, M.D.
Woods, John,	Philada.,	Pa.	H. L. Woods, M.D.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Worrall, Harry,	Downingtown,	Pa.	N. B. Danforth, Ph. G.
Wright, John Armstrong,	Philada.,	Pa.	A. W. Wright & Co.
Yale, William Ellsworth,	Allentown,	Pa.	H. E. Peters.
Yohn, Frank Jerold,	Pottstown,	Pa.	T. J. Hoskinson, Ph.G.M.D
Yost, Harvey B.,	Bethlehem,	Pa.	E. T. Meyers.
Young, Charles,	Johnstown,	Pa.	T. H. Potts, Ph. G.
Ziegel, Roger William,	York,	Pa.	S. M. Gable.
Zinnel, William Corson,	Philada.,	Pa.	Howard Knight, Ph.G.

SENIOR CLASS

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Alwine, John, Jr.,	Philada.,	Pa.	Harrison Bros. & Co.
Amerman, Ella,	Danville,	Pa.	S. Hayhurt, M. D.
Angeny, Joseph S., Jr.,	Doylestown,	Pa.	Luther Gerhard.
Bachman, Chas. Fred.,	Sacramento,	Cal.	R. H. McDonald & Co.
Bacon, Francis Llewellyn,	Philada.,	Pa.	Robt. Shoemaker & Co.
Baird, Robert,	Amsterdam,	N. Y.	C. G. A. Loder.
Barrett, Charles Llewellyn,	Chester Co.,	Pa.	Daniel S. Jones, Ph. G.
Batdorff, Henry James,	Lykens,	Pa.	A. H. Bolton.
Bear, John H.,	Mt. Joy,	Pa.	E. B. Garrigues & Co.
Beckwith, James Webb,	Elmira,	N. Y.	Kennedy & Burke,
Bell, James Edgar Stevenson,	Los Angeles,	Cal.	Davis & Whisler.
Benerman, Alan Herbert,	Philada.,	Pa.	J. F. Hayes, Ph. G.
Benner, Isaac,	Philada.,	Pa.	O. H. Stermer.
Bennum, Charles Henry,	Georgetown,	Del.	Harry Swain, Ph. G.
Bently, David Fuller,	Conshohocken,	Pa.	Robt. Shoemaker & Co.
Bippus, Charles William,	Bellaire,	Ohio	C. E. Hewitt, Ph. G.
Birch, Harry Rees,	Philada.,	Pa.	Bullock & Crenshaw.
Blackburn, Robert Perry,	Lock Haven,	Pa.	T. C. Hilton & Co.
Blouch, Charles Henry,	Lebanon,	Pa.	
Bond, Ira Linton,	Tamaqua,	Pa.	John F. Bond.
Bowen, Charles Alfred,	Sennett,	N. Y.	A. G. Miller.
Bowers, Charles Edward,	Middletown,	Pa.	J. W. Rewalt.
Bowker, Frank,	Camden,	N. J.	Geo. C. Webster, Ph.G.
Breidenbach, Charles Henry,	Dayton,	Ohio	Dr. W. A. Burns.
Buchanan, Frank,	Crum Lynn,	Pa.	C. H. Roberts, Ph. G.
Bunting, James Hicks,	Wilmington,	N. C.	John H. Hardin.
Burgess, Milton S.,	Cambridge,	Ohio	C. S. Wall & Co.
Burnett, J. Ames Howard,	Hackensack,	N. J.	Levi B. Hirst, Ph. G.
Butters, Charles Hayes,	Titusville,	Pa.	T. W. Reuting, Ph. G.
Cahill, Frank Joseph,	Trenton,	N. J.	J. E. Cahill.
Campbell, William H.	Philada.,	Pa.	
Cannon, C. Walton,	Bridgeville,	Del.	R. W. Cannon.
Carman, Frank Hamilton,	Pennsgrove,	N. J.	J. G. Howard.
Carroll, Sherman Lincoln,	Philada.,	Pa.	A. Weber, Ph. G.
Castle, Abraham Lincoln,	Upland,	Pa.	A. S. Buchanan.
Cawley, Charles,	Manchester,	Iowa	E. J. Congar.
Christ, Frantz,	Philada.,	Pa.	J. D. Moore, Ph. G.
Clark, William Henry,	Madrid,	N. Y.	Parke Davis & Co.
Coleman, Fred'k Frelinghuysen,	Asbury Park,	N. J.	J. B. Moore.
Codville, Wm. L.	Philada.,	Pa.	C. G. A. Loder.
Cope, Frank Henry,	Philada.,	Pa.	W. A. Auffurth, M. D.
Copeland, George Hogan,	Renovo,	Pa.	Hall & Bro.
Courson, Harry Stockton,	New Berry,	Pa.	Wilbur F. Crawford.
Crass, John Henry,	Bridgeton,	N. J.	Chas. H. Clark, Ph. G.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Crawford, Martyn Payne,	Mifflintown,	Pa.	L. Banks & Co.
Crumbic, George Joseph,	Philada.,	Pa.	Decatur Milligan.
Crutcher, William,	Louisville,	Ky.	J. Oxley.
Culin, Walter,	Philada.,	Pa.	W. S. Reeve.
Davies, William Owen,	Slatington,	Pa.	J. A. Wiegner, Ph. G.
Davis, Clayton Erwin,	Florence,	Mass.	Nelson A. Davis.
Davis, Edward,	Minersville,	Pa.	D. R. Davis.
Davis, John Stephen Voorhees,	Wilmington,	Del.	Bullock & Crenshaw.
Davison, Joseph Childs,	Washington,	D. C.	A. D. Cuskaden.
Dean, Malcolm Graeme,	Newtown,	Pa.	I. J. Grahame.
DeHaven, Samuel Robert,	Toledo,	Ohio	A. Heitzman.
Demoville, James Louis,	Nashville,	Tenn.	Demoville & Co.
Donaldson, Thomas,	Wilmington,	Del.	N. B. Danforth, Ph. G.
Donnell, George James,	Clifton Heights,	Pa.	Geo. E. Dennison.
Dunn, Clifford,	Chicago,	Ills.	W. R. Warner & Co.
Durell, Kinsey Embury,	Philada.,	Pa.	J. W. Kohlerman.
Dyer, Charles Ellsworth,	Topeka,	Kansas	J. K. Jones.
Eads, Robert I.	Ashland,	Ky.	John C. Maisch.
Edenborn, Chas. Wesley Simons,	Philada.,	Pa.	L. G. Bauer, Ph. G.
Eisenhart, Edwin Kammerer,	Bingen,	Pa.	R. F. Babb.
Elfreth, Jr., Caleb Pierce,	Philada.,	Pa.	C. P. Elfreth.
Evans, Charles Born,	Harrisburg,	Pa.	James A. Myers.
Evans, William,	Philada.,	Pa.	J. B. Reynolds.
Fegley, Oscar George,	Pottsville,	Pa.	J. S. Ward, M. D.
Fletcher, Benjamin Kennard,	Philada.,	Pa.	J. D. McFerren.
Frantz, Wil. Lintner,	Lancaster,	Pa.	G. W. Hutt.
Franz, Frederick W.	Sioux City,	Iowa.	F. Hansen.
Froelick, Walter Scott,	York,	Pa.	B. S. Gilbert, Ph. G., & Co.
Gabell, Cromwell Pearce,	Florence,	N. J.	Bullock & Crenshaw.
Gallaher Charles Sumner,	Neillsville,	Wis.	Chas. C. Smiteman.
Green, Philip Henry,	Reading,	Pa.	Henry A. Borell, Ph. G.
Groom, Joseph,	Philada.,	Pa.	Hance Bros. & White.
Gros, Lucian Alfred,	San Francisco,	Cal.	Samuel S. Bunting.
Grosse, Gottlieb Matthew,	Cleveland,	Ohio	C. H. Bohn.
Greenfield, Oliver Roat,	Wilmington,	Del.	H. K. Watson.
Haak, Harry Capp,	Pine Grove,	Pa.	John B. Raser, Ph. G.
Haley, John Joseph,	Germantown,	Pa.	M. Kratz, Ph. G.
Hauck, Samuel Light,	Lebanon,	Pa.	Jefferson Hospital.
Haussmann, Frederick William,	Philada.,	Pa.	Christian Weis.
Hazel, Thomas Harold,	Cressona,	Pa.	Irwin L. Lautenbacher.
Hebsacker, William Frederick,	Philada.,	Pa.	J. Wendel.
Heffley, Harry Baker,	Somerset,	Pa.	E. & G. A. Fruh.
Hellmich, M.,	Philada.,	Pa.	G. H. Ochse.
Hennessey, Sherman Francis,	Pottsville,	Pa.	C. H. Wagner.
Hetherington, Thomas,	Philada.,	Pa.	Wetherill & Bro.
Hibshman, Paul Robert,	Myerstown,	Pa.	Bullock & Crenshaw.
Hoch, Aquila,	Bushkill Centre,	Pa.	W. H. Lantz.
Hooper, Sidney L.,	East New Market,	Md.	Bullock & Crenshaw.
Hume, Ward Dutcher,	Minneapolis,	Minn.	Robert McNeil, Jr.
Iobst, Frederick John,	Emmaus,	Pa.	George E. Dahis, Ph. G.
Jacobs, Eugene Jacob,	Atlanta,	Ga.	Joe Jacobs.
Jacobs, John Penn Jones,	Hollidaysburg,	Pa.	P. W. Snyder.
Johnson, Claude Grant,	Cumberland,	Md.	H. Laney.
Johnson, Frank R.,	Chester,	Pa.	G. Banks Wilson, Ph. G.
Johnson, Frederick Leighton,	Cape May,	N. J.	
Johnson, William A. S.	Charlottetown,	Canada	Apothecaries Hall Co.
Jones, Lysander Mann,	Canton,	Pa.	James O. Whitman,
Jones, Peter Lawrence,	Jamestown,	N. Y.	A. F. Johnson.
Jones, William Carrell,	New Egypt,	N. J.	J. Harley Compton.
Judge, John Aloysius,	Philada.,	Pa.	Carpenter, Henszey & Co.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Kalteyer, William Charles,	San Antonio,	Texas	George H. Kalteyer.
Kappes, Frederick Franklin,	Zanesville,	Ohio	W. H. Carlisle Ph. G.
Keefer, Charles De Walt,	Chambersburg,	Pa.	C. H. Cressler.
Kennedy, Albert Dennis,	Philada.,	Pa.	A. Nebeker, M. D.
Klopp, Peter Paul,	N. Heidelberg,	Pa.	N. Davis, Ph. G.
Kraemer, Henry,	Philada.,	Pa. Dr.	Clement B. Lowe, Ph.G.
Krider, Richard C.,	Philada.,	Pa.	Stryker & Ogden.
Kuder, William,	Leetonia,	Ohio	H. H. Ink & Co.
Lammer, Henry Bruno,	Philada.,	Pa.	Bullock & Crenshaw.
Leitch, Charles Thomas,	Quakertown,	Pa.	C. W. Clymer & Co.
Lenhardt, Oliver F.,	Lancaster,	Pa.	A. A. Hubley.
Leshar, Edwin C.,	Kutztown,	Pa.	H. G. Haring, Ph. G.
Lewis, Griffith Robert,	Catasauqua,	Pa.	Edward D. Boyer.
Lippen, Harry,	Salem,	N. J.	H. M. Levering.
Livezey, John Bennett,	Doylestown,	Pa.	Dr. G. T. Harvey.
Ludlam, William Hall,	Brooklyn,	N. Y.	C. H. Gubbins, Ph. G.
Lynch, Albert James,	Woodstock,	Canada	Garden Bros.
Lyons, George,	Philada.,	Pa.	Beates, Miller & Lambert.
Macarthy, Frank Hamilton,	Berwyck,	Pa.	Grove & Kisner.
Macpherson, Frank Street,	Trenton,	N. J.	L. H. Street.
Madeira, Robert Wesley,	Shoem'krsville,	Pa.	John B. Raser, Ph. G.
Maris, Robert Wood,	Philada.,	Pa.	S. C. Webster, Ph. G.
May, John Aj.,	Manchester,	Ohio	C. C. Spannagel.
McCandless, Edward Sloan,	Philada.,	Pa.	J. W. Frey.
McClellan, Leslie Corwin,	Denver,	Col.	E. L. Scholtz.
McClure, Berthier,	Milton,	Pa.	Dr. E. S. Heiser.
McDowell, Charlie Hunt,	Lambertville,	N. J.	S. W. Cochran.
McIntosh, John R.,	Galion,	Ohio	B. N. Bethell, M. D.
McMechen, Wm. Benj.,	Wheeling,	W. Va.	W. H. Williams.
McNair, Edward Dudley,	Tarboro,	N. C.	L. C. Funk, Ph. G.
McNeil, Robert Carson,	Philada.,	Pa.	Robert McNeil, Jr.
Meissner, Frederick William,	La Porte,	Ind.	Eli Lilly's Sons.
Meyers, Harry Joseph,	Bethlehem.	Pa.	E. T. Meyers.
Miles, Chas. John Austin,	Manchester,	N. J.	R. W. Cuthbert, Ph. G.
Müntzer, William Christian,	Evansville,	Ind.	W. F. Epmeier.
Moffet, John,	Philada.,	Pa.	John Moffet.
Moller, John Daniel,	Philada.,	Pa.	Dr. Lamparter.
Moody, Thomas Frank,	Cuthbert,	Geo.	J. W. Stanford.
Moore, Edward, Jr.,	Media,	Pa.	Robert T. Grime.
Morison, John Lewis Dales,	Morton,	Pa.	W. E. Dickeson, Ph.G.
Moss, William,	Akron,	Ohio	H. H. Ross.
Muir, John Roy,	Lock Haven,	Pa.	W. A. Rumsey, Ph. G.
Mumma, Frank Gereon,	Mechanicsburg,	Pa.	Dr. J. H. Boyer.
Murphy, Frank Edward,	Kansas City,	Mo.	J. A. Gallagher.
Murray, Harry Louis,	Philada.,	Pa.	Murray & Smiley.
Murray, Wm. Robert,	Harrisburg,	Pa.	A. W. Nunemacher.
Musgrave, Aaron Wallace,	Bloomsburg,	Pa.	L. E. Sayre.
Nardyz, Miss Emma Bour,	Philada.,	Pa.	Susan Hayhurst, M. D.
Neal, Charley Bodine,	Woodbury,	N. J.	A. S. Marshall, Ph. G.
Nolte, Henry Augustus,	Swedesboro,	N. J.	C. C. Hughes.
Nolting, Geo. William Fred.,	Seymour,	Ind.	J. A. Andrews.
Oerter, Albert Eugene,	Bethlehem,	Pa.	Simon, Rau & Co.
Ogden, Charles Shepperd,	Camden,	N. J.	W. F. Richards.
Painter, Howard Thatcher,	Darby,	Pa.	Harlan Cloud.
Palen, Joseph Alphonse,	Dubuque,	Iowa	G. F. Thorman.
Pfund, Harry Lewis,	Philada.,	Pa.	John A. Martin, Ph.G.
Pickett, Charles Torbert,	New Hope,	Pa.	H. C. Blair's Sons.
Pierce, William Abner,	West Chester,	Pa.	Thos. G. Pierce.
Pollock, Jr., Robert Blair,	Philada.,	Pa.	J. R. Elfieith, Ph. G.
Poppenhusen, Jr., Hly. Aug. Chas.	Washington,	Mo.	C. A. Wreckshagen.

Name.	Place.	State.	Preceptor.
Porter, Clawford Washington,	Philada.,	Pa.	Jas. T. Shinn, Ph. G.
Pringle, Jr., James Maxwell,	Columbia,	S. C.	L. A. Podolski.
Rabenau, John Herman,	Pottsville,	Pa.	Herman Rabenau, Jr.
Ranfle, Oscar,	Long Is'd City,	N. Y.	W. E. Lee.
Rawlins, Wilbur Fisk,	Dover,	Del.	Givin & Co.
Rayner, Howard Lincoln,	Norristown,	Pa.	R. Shoemaker & Co.
Rea, John,	Chester,	Pa.	W. H. Farley.
Reck, Charles Lincoln,	Greenville,	Ohio	W. Delker, M. D.
Reed, Howard,	Doylestown,	Pa.	Edgar P. Paris.
Redner, Thaddeus Rowland,	Rowlandville,	Pa.	N. W. Hickman, Ph. G.
Reith, Emil,	Philada.,	Pa.	T. A. Walker.
Richards, Howard Newton,	Trenton,	N. J.	Irving W. Kelly, Ph. G.
Reidenauer, Frederic Philips,	Philada.,	Pa.	Bullock & Crenshaw.
Rishell, John Dauberman,	Centre Hall,	Pa.	John Harris.
Rochrig, Albert Henry,	Pottsville,	Pa.	Geo. H. Rochrig, Ph. G.
Rosen, Gustave,	Louisville,	Ky.	F. V. Simms.
Rourke, Michael Joseph,	Reading,	Pa.	John A. Gingrich.
Ruoff, William,	Philada.,	Pa.	Daniel Follmer.
Ryan, David Stephen,	Scranton,	Pa.	John J. Davies.
Sandifer, Myron Harris,	Rock Hill,	S. C.	D. E. E. Zacherle.
Schlaepfer, August James,	Evansville,	Ind.	H. J. Schlaepfer.
Schleif, Jr., William,	Milwaukee,	Wis.	Aschenbach & Miller.
Schindel, Harry Ellsworth,	Philada.,	Pa.	L. C. Funk.
Schmitt, Herm'n Thad. Stevens,	Philada.,	Pa.	V. H. Smith & Co.
Schroeter, Hermann John M.,	Watertown,	Wis.	R. H. Brennecke.
Schuster, George Robert Wm.,	Washington,	D. C.	William J. Pechin.
Schulte, Henry,	Cincinnati,	Ohio	G. A. Appenzeller, Ph. G.
Seasholtz, Jacob Clay,	Sunbury,	Pa.	Jos. Rex Devon,
Seiffert, John Henry,	York,	Pa.	Wm. Smith & Co.
Shaw, Henry Burfield,	Philada.,	Pa.	A. L. Lumb.
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AMERICAN

No. 2

JOURNAL OF PHARMACY.

PUBLISHED BY AUTHORITY OF THE

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Under the supervision of the Publishing Committee, consisting of

HENRY N. RITTENHOUSE, JAMES T. SHINN, CHARLES BULLOCK, T. S. WIEGAND,

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Price, \$3.00 per Annum,
in advance.

Issued in Monthly numbers of
not less than 48 pages.

Single No. } Fourth Series. FEBRUARY, 1888. Vol. XVIII., No. 2
30 cts.

CONTENTS.

Will Pharmacists Accept? By Joseph P. Remington	65	Mercurammonium Chlorides. By Frank X. Moerk, Ph.G.	80
An Easy Method of Finding the Specific Gravity of Liquids. By Alfred B. Taylor, Ph.M.	67	An Examination of Cascara Sagrada. By H. F. Mier and J. LeRoy Webber.	87
Emulsion of Terebene. By Joseph W. England, Ph.G.	68	Fluid Extract of Cascara Sagrada. By Wm. Bichy.	92
Syrupus Lactucarii. By George W. Beringer, Ph.G.	70	Analysis of Ricinus Communis. By Addison Lloyd Beck, Ph.G.	93
Fluid Extract of Caulophyllum. By J. H. Bunting.	73	Abstracts from the French Journals.	98
Fluid Extract of Yerba Santa (Eriodictyon Glutinosum). By F. B. Quakenbush.	74	Gleanings from the German Journals. By John A. Martin, Ph.G.	102
Analysis of the Leaves of Eupatorium Perfoliatum. By F. W. Franz.	77	The Drug Business in Australia, India and the United States.	104
The Bitter Principle of Burdock Fruit. By Henry Trimble.	79	Varieties.	108
		Minutes of the Pharmaceutical Meeting.	109
		Editorial.	110
		Reviews and Bibliographical Notices.	111

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THE AMERICAN JOURNAL OF PHARMACY.

FEBRUARY, 1888.

WILL PHARMACISTS ACCEPT ?

BY JOSEPH P. REMINGTON.

The attention of the writer having been directed to the following letter by Dr. E. Cutter, N. Y., in the *Journal of the American Medical Association*, December 17, 1887, by Mr. J. M. Colcord, of Lynn, it would appear to call for the earnest consideration from pharmacists that the importance of the subject demands :

WHY NOT THE PHARMACISTS ?

Dear Sir:—The late innovation of having a Section of Dentistry at the Ninth International Medical Congress working so well, and the great excellence of the pharmaceutical display, invite the question, Why not have a Section of Pharmacy in the American Medical Association ?

It is simply raised for discussion, adding the following memoranda :

1. Pharmacy is a branch of medicine.
2. In many parts of our country the physician is his own pharmacist, and every man would be his own pharmacist if it could be done consistently with his work.
3. Therapeutical pharmacy is equally as honorable, important, and valuable as any other branch of medicine.
4. Pharmacy has of late instructed the medical profession by therapeutical and medical journals, monographs and publications, forming a literature that medical men must get acquainted with or be left behind; the literature of cocaine for example.
5. Such a Section should be composed of, managed, and under the control of such bodies as the American Pharmaceutical Association, and be an autonomic department regulated by itself, as the Dental Section is.
6. The objection arising from the existence of disreputable and incompetent pharmacists, applies with equal force to physicians, but has not prevented the organization of the American Medical Association.
7. Such a Section would confer a social equality and standing on the pharmacists that would be healthy.
8. It would throw them into professional contact with physicians pleasantly,

and conferences could be had as to desirable points to be made, and the result would tend to prevent each from trenching on the other's domains.

9. In the battle with disease, physicians, surgeons, dentists, specialists, pharmacists, and veterinarians, ought to move harmoniously forward against the enemy that means *war*; and *war* means *kill or be killed*. Nothing is gained by derision and decrying opposition of one division against the other, which often result in defeat. On the contrary, there is everything to be found by the mutual confidence, respect, and trust which such a Section would inspire and foster.

10. The overture should come from the American Medical Association.

E. CUTTER, M. D.

New York, November, 1887.

There can be no question about the desirability of making a strong effort to bring together the best elements of the professions of medicine and pharmacy, and it is very doubtful if a more opportune time than the present can be secured for the inauguration of a concerted movement looking to this end.

Dr. Cutter has outlined briefly, but clearly, many of the advantages that would be derived from the establishment of a Section on Pharmacy in the American Medical Association, and if an invitation were extended to the American Pharmaceutical Association, it would doubtless find favor, and be accepted.

One very important reason for a medium for interchange of ideas has not been alluded to by Dr. Cutter, and this is, the necessity for extended joint conference by physicians and pharmacists upon the approaching revision of the United States Pharmacopœia. Much of the unfavorable criticism upon the last edition of this standard would have been avoided, if the members of both professions represented in the national organizations of each, had previously convened and presented a joint report to the Washington convention embodying their views. The pharmacopœia of a country having the magnitude of ours, coupled with such diversity in population and climate, as we have here, *materia medica* must contain remedies which are representative, and which satisfy the needs of all sections, and whilst the actual work of compiling the Pharmacopœia is best performed by a committee specially appointed by a convention called solely to consider the work, there is no doubt that the views of the American Medical Association (if they had been offered at the last convention, for revising the Pharmacopœia) would have received the same consideration that those of the American Pharmaceutical Association did; and this practically amounted to the almost complete adoption of their report.

In the reorganization of the American Pharmaceutical Association at the Cincinnati meeting, in September, 1887, one of the most important changes introduced was the classification of the various subjects which annually come before the meeting, under appropriate heads, and providing for their discussion by referring them to Sections especially organized for their consideration.

If the invitation now proposed by Dr. Cutter should be tendered to the Pharmaceutical Association there will be presented an excellent opportunity for reciprocity, through the establishment of a Section devoted to the interests of medicine, and as the conventions of the National Associations occur usually four or five months apart, the meetings of the Section on "Pharmacy in its relations to Medicine" in the American Medical, and that of the Section on "Medicine in its relations to Pharmacy" in the American Pharmaceutical Association would doubtless have a good influence in fostering harmony, and creating that mutual confidence and trust which is now so earnestly desired in combating the evils which harass both professions. *Cannot all little differences be swept aside*, the ice be broken, and an honorable bond of union be established?

AN EASY METHOD OF FINDING THE SPECIFIC GRAVITY OF LIQUIDS.

BY ALFRED B. TAYLOR, PH. M.

A new application of an old rule has suggested a method of finding the specific gravity of liquids, which I have never seen mentioned, and which from its simplicity and great ease of application seems worthy of publication. By means of it the specific gravity of any liquid can be ascertained without calculation, or any apparatus other than a good balance and accurate weights.

It is known that the weight of a body is to its specific gravity, as its loss of weight when immersed in a liquid, is to the specific gravity of that liquid; for example:—200 grains of citric acid (sp. gr. 1.60) lose in weight 115 grains when weighed in oil; and as 200 is to 1.60, so is 115 to .920 the sp. gr. of the oil. Now if we make the weight of the citric acid the same number of grains as its specific gravity our formula becomes—as 1.60 is to 1.60, so is the loss in weight of the citric acid when weighed in oil to the specific gravity of the oil; or,

in other words, the loss of weight is equal to the specific gravity ; from which we deduce the following general rule :—

The specific gravity of a liquid is equal to the loss of weight (in grains) sustained by a solid body when immersed in the liquid, the weight of the solid being equal (in grains) to its specific gravity.

Hence it is necessary only to weigh the solid in the liquid, and its loss gives at once the specific gravity of the liquid.

Taking the preceding example :—if 200 grains of citric acid lose 115 grains, 1·6 grain will lose .920 grain, and this loss is equal to the specific gravity of the oil.

In practice the weight of the solid might be 10 or 100 times the weight of its specific gravity, care being taken to put the decimal point in the right place in the final result.

As perhaps one of the most desirable solid bodies to use, I would suggest a piece of aluminium weighing 256 grains ; the specific gravity of that metal being 2·56. If upon trial its specific gravity should vary from these figures, its weight should be made to correspond.

For liquids having greater specific gravity than 2·56, it would be necessary to use a heavier solid than aluminium.

EMULSION OF TEREbene.

By JOSEPH W. ENGLAND, PH.G.

Read at the Pharmaceutical Meeting, January 17.

In the internal administration of oleaginous and non-oleaginous volatile liquids, the tendency of the times seems strongly tending towards the universal adoption of the emulsion, as the most satisfactory form of preparation, and, when it is remembered, especially as regards the fixed and volatile oils, that the more finely divided in physical condition, with which they are presented to the digestive apparatus, the less liability there is to cause nausea and eructation, and the more readily do they undergo digestion and absorption (or conversely) the naturalness of using an emulsion is readily explained.

As a rule the fixed oils yield most readily to emulsifying influences, so that their suspension presents no especial difficulties, but in the case of volatile oils and liquids we find a different state of affairs. Whilst a few of these readily give good emulsions, this result is by no means a universal one, and is secured only after using relatively

large quantities of powdered acacia, with the loss of a varying per cent. of the volatile liquid emulsified, incident to the long trituration necessary to suspend it. Even when finished they are prone to separate. We find this especially the case with such liquids as ether, chloroform, terebene, etc.

Numerous expedients have been suggested, but each in turn, have failed to come up to the sanguine hopes of their proposers. Taking advantage of the great emulsionizing properties of milk, the writer has advocated, for some time, the giving of these and similar liquids in that natural emulsion, with each dose, and the results obtained have been most satisfactory. The advantages are readily apparent; first, in the accuracy of the dose since none of the liquid can be lost by volatilization as in the preparation of emulsions, and, second, in its acceptability to the patient.

As a remedy in the treatment of certain throat affections, terebene has, in the last few years, attained considerable prominence in medical circles, but its employment has been restricted on account of the impossibility of obtaining an emulsion with it, and recourse was then had to the simpler method of giving in capsules or dropping on sugar and dissolving in the mouth, and this is the mode of administration in general use at present.

This expedient, however, is a very unsatisfactory one, and the writer here gives a new process for the emulsion, based upon the fact that terebene is readily emulsionized, if previously mixed with an equal volume of cotton-seed oil. The formula used is as follows:

Take of

Terebene.....	
Ol. gossyp. sem.....	aa m. clx.
Pulv. acaciæ.....	3 vj.
Pulv. sacchari.....	3 ij.
Aquæ q. s. fiat.....	f 3 iv.

Mix.

Dose : 1 to 2 teaspoonfuls (=10-20 drops).

The product is a milk-white, perfectly suspended liquid, having the odor, and bitter, turpentine-like taste of terebene, and is miscible with water, without separation.

This method, of previously admixing with cotton-seed oil, is very useful in suspending volatile oils, especially the oils of gaultheria and eucalyptus, which have come into such general use within the past year, and it is more economical, in that a much less quantity of acacia

is necessary for suspension, but it is of no value whatever in the emulsification of such liquids as ether and chloroform, so that we are compelled to fall back, in their administration, upon previous admixture with milk, as each dose is given; a temporary expedient only, possibly, but one which has certainly yielded good results.

SYRUPUS LACTUCARII.

By GEO. M. BERINGER, Ph.G.

Read at the Pharmaceutical Meeting, January 17.

The formula for syrup of lactucarium of the Pharmacopœia of 1870 yielded a preparation which, to say the least, was not desirable; being unsightly, turbid and not answering the requirements of modern elegant pharmacy. The *modus operandi*, briefly* stated, consisted in treating one troy-ounce of lactucarium properly comminuted with diluted alcohol until a half pint of tincture was obtained. This tincture, evaporated at a temperature not exceeding 160°F. to 2 fluid-ounces, was mixed with 14 fluid-ounces of warm syrup.

That the turpidity and unsightliness of this preparation was due to the lactucerin or lactucone—the caoutchouc-like matter—was early recognized. In 1868, Mr. James Kenworthy recommended that the tincture be triturated with powdered pumice-stone and water, and filtered, and then decolorized by treating with animal charcoal before adding the sugar.

The same year, Mr. R. F. Fairthorne recommended that the tincture prepared as in the process of the Pharmacopœia of 1870, be treated with ether to dissolve out the lactucerin, the ethereal solution separated and the tincture then mixed with sugar and water.

In 1878, Mr. Lemberger proposed treating the lactucarium with benzin previous to its extraction with diluted alcohol, and submitted the following formula for the fluid extract to the Committee on Revision of the Pharmacopœia:*

Take of

Lactucarium	16 parts.
Benzin.....	32 "
Diluted alcohol, a sufficient quantity.....	

Beat the lactucarium thoroughly in an iron mortar, then introduce

* Proceedings American Pharmaceutical Association, 1878.

it into a wide-mouth bottle of the capacity of about 48 parts of water, add the benzin, cork tightly, and macerate, with frequent agitation, for twenty-four hours. Then let it stand for about twenty-four hours, or until the lactucarium subsides and the benzin solution becomes clear or nearly so. Decant the benzin solution, transfer the lactucarium to a stone or glass slab, spread it as thin as possible, and allow it to remain there until it is completely dry (at least twenty-four hours). Then rub it in an iron mortar with an equal weight of clean sand, introduce it into a conical percolator, first prepared with a disk of flannel and a thin layer of sand, pack tightly and add diluted alcohol to a depth of several inches. When the liquid begins to drop, close the orifice of the percolator with a cork and allow it to stand at rest, well covered, for twenty-four hours. Now remove the cork and collect 4 parts of percolate, which set aside. Continue the percolation until the lactucarium is exhausted, recover the alcohol from the percolate by distillation from a water-bath, and evaporate the residue on a water-bath to 10 parts. Mix this with the reserved portion, filter and wash the filter with enough diluted alcohol to make the whole product weigh 16 parts.

In this process the lactucerin is not entirely removed. That portion of the benzin remaining in the lactucarium after decanting, which is considerable, remains saturated with lactucerin, sufficient to leave the lactucarium, on drying, of a gummy tendency and difficult to pulverize and sufficient to be extracted by the subsequent treatment with diluted alcohol, and to render the syrup made therefrom decidedly turbid.

If, however, the lactucarium after decanting the clear layer of benzin is thrown on a double paper filter and then washed with about half the quantity of benzin first used, this dissolved portion will be forced out and the lactucarium remaining will dry and be easily pulverized and extracted.

The Pharmacopœia of 1880 instituted a new departure, adopting a formula for a fluid extract. The aim of this formula, as of all recent formulæ and investigations, was to furnish a preparation from which a perfectly clear and acceptable syrup could be made by simple admixture. The officinal formula devised by Prof. C. L. Diehl is remarkable for its complexity. No attempt is made to remove the lactucerin; the treatment with ether merely aiming to disintegrate and separate it from the other ingredients, and leave it in such a

condition that comparatively little will be dissolved by the subsequent macerations with weak alcohol, and this is largely deposited on evaporating the strained solutions and allowing to stand for a time.

While the product of the present official formula is a decided improvement on that of the previous Pharmacopœia, it is not entirely satisfactory, the method being expensive and difficult. As the use is rather limited, but few retail druggists will attempt to prepare it, depending on the manufacturing pharmacist for their supply of the fluid extract. As the official formula is not satisfactory in manipulation or in product, it is not generally followed by these manufacturers. It becomes the duty of the revisers of our national standard to adopt such a formula as will be practical for the retailer or the manufacturer. I am of the opinion that a radical mistake of all the proposed formulæ for fluid extract of lactucarium is the attempt to make a fluid extract of the strength of 100 gm. to the 100 c.c. In fact, all fluid extracts would be rendered more permanent and uniform in medicinal effects if a strength of one-half troy-ounce to the fluid-ounce, or of 50 gms. to the 100 c.c. had been adopted. This is especially the case with a drug like lactucarium, yielding to diluted alcohol nearly fifty per cent. of its weight. In confirmation of this point, I would say that several of the principal manufacturers are making this fluid extract of only one-half the official strength.

I have been preparing syrup of lactucarium from a fluid extract, or, I should rather say, a concentrated tincture of lactucarium of one-half the official strength. The formula which is based on that of Mr. Lemberger is as follows :

Take of

Lactucarium..... 100 gms.

Beat it up in an iron mortar with an equal weight of clean sand (I prefer small pieces of pumice-stone) to a coarse powder and place it in a large bottle with

Benzin..... 400 c.c.

Tightly cork the bottle and allow to macerate for 2 or 3 days with repeated agitation. Decant the lactucarium in a double paper-filter and allow it to drain. Wash the dregs with about 100 or 150 c.c. of benzin and allow the lactucarium to dry by opening out the filter on a slab or a few sheets of porous paper. When dry rub it up in an iron mortar, using a little more sand or pumice, if necessary, and pack

lightly in a conical percolator. Cover with a layer of several inches with a menstruum of

Glycerin.....	25 c.c.
Water	75 c.c.
Alcohol.....	100 c.c.

Tightly cork the lower orifice of the percolator and allow to macerate for 24 hours. Then continue the percolation reserving the first 125 c.c. of percolate. Continue the percolation, using diluted alcohol, until the lactucarium is extracted. Evaporate this tincture in the water-bath at a moderate temperature (about 160° F.) to 75 c.c. and mix with the reserved portion. Filter and add enough diluted alcohol through the filter to make the finished product measure 200 c.c.

To prepare the syrup,

Take of

Concentrated tincture of lactucarium.....	10 gms.
Syrup.....	90 gms.

Mix.

The samples of syrup and of the concentrated tincture submitted were prepared in May 1887, since which time they have remained in the same vials and have not been filtered. I submit another sample of syrup made at the same time, as follows:

Concentrated tincture of lactucarium.....	10 gms.
Glycerin.....	10 gms.
Syrup	80 gms.

Mix.

FLUID EXTRACT OF CAULOPHYLLUM.

Contribution from the Pharmaceutical Laboratory, Philadelphia College of Pharmacy.

By J. H. BUNTING.

Read at the Pharmaceutical Meeting, January 17.

Different menstrua were used on four portions of caulophyllum, each of 8½ ounces avoirdupois, in No. 60 powder, and the resulting products were numbered one, two, three and four respectively.

Dilute alcohol was used in No. 1. After moistening the drug it was firmly packed in a cylindrical percolator and sufficient menstruum was added to saturate the powder and leave a stratum above. When the liquid began to drop, the lower orifice was closed, the percolator

covered and the contents macerated for 48 hours. At the expiration of this time, the percolation was allowed to proceed until the drug was exhausted. The first 6½ fluidounces of the percolate were reserved, and the remainder evaporated to a soft extract and dissolved in the reserve portion, adding sufficient diluted alcohol to make the finished product measure 8 fluidounces. This menstruum was not a good one. The extract was not clear and a heavy deposit took place.

In No. 2 a menstruum of 2 parts alcohol and 1 part of water was used. The manipulations with this and the subsequent ones were as in the preceding one. A better product was obtained by the use of alcohol and water in this proportion. It was not, however, a satisfactory product, as there was a considerable deposit on allowing it to stand.

No. 3, in which 3 parts alcohol and 1 part water were used as a menstruum, proved to be the best of the lot. A very good fluid extract was obtained which remains clear with only a slight deposit after allowing it to stand undisturbed more than two months.

In No. 4 the same menstruum, *i. e.*, diluted alcohol, as in No. 1, was used, except that 10 per cent. of glycerin was added to the first 8 fluidounces of menstruum used. A very unsatisfactory product resulted from the use of the glycerin; the deposit being greater than in No. 1.

FLUID EXTRACT OF YERBA SANTA (ERIODICTYON GLUTINOSUM).

Contribution from the Pharmaceutical Laboratory, Philadelphia College of Pharmacy.

BY F. B. QUACKENBUSH.

Read at the Pharmaceutical Meeting, January 17.

A formula for the above extract having been desired, the following experiments were undertaken with the view of determining the best menstruum to secure permanency in the fluid extract, and thorough exhaustion of the drug. The herb of *Eriodictyon glutinosum*, or as it is sometimes called, *Eriodictyon californicum*, was used in these experiments. It is non-official, and no formula is given in the dispensaries for its preparation, and as one of the objects was to find the

best menstruum for the drug it was concluded, after considering its character, to use in one case a menstruum of 3 parts alcohol and 1 part water, and in the other case one consisting of 2 parts alcohol and 1 of water.

The first formula is as follows :

Yerba santa in No. 60 powder.....	225 gm.
Alcohol.....	168 gm.
Water.....	57 gm.

To make 225 c.c. of the finished product.

The drug after being thoroughly moistened with 1½ fluidounces of the menstruum, was firmly packed in a cylindrical percolator, fitted at the neck with a cork of such size that when placed tightly in position it was about half way down the neck of the percolator. A glass tube was passed through the centre of the cork so that the upper end of the glass was flush with the upper surface of the cork, and of sufficient length to protrude a short distance below the neck of the percolator. A short piece of rubber tubing was placed upon the lower end, leaving about two inches of the tubing below the glass, on which was placed a pinchcock to regulate the flow. A small piece of cotton, previously moistened with the menstruum, was placed in the neck of the percolator, and pressed firmly down upon the surface of the cork. After packing the powder in the percolator a small disc of filtering paper was placed upon the drug, and the menstruum gradually added, always keeping a stratum above the surface of the drug, until the liquid began to drop from the percolator. The pinchcock was then closed, the top of the percolator tightly covered with a piece of waxed paper and maceration was continued for forty-eight hours. The liquid was subsequently allowed to drop slowly from the percolator, and the balance of the menstruum gradually added. The first 200 c.c. was set aside as the reserve portion, and the balance collected in another bottle; 225 c.c. of the menstruum were not sufficient to exhaust the drug, hence 140 c.c. more menstruum were added. The menstruum which had been absorbed by the drug was forced through by pouring 20 fluidounces of water into the percolator. The weak percolate was distilled to recover the alcohol, and the residue evaporated to a soft extract by means of a water-bath. The extract was dissolved in the reserve portion, and sufficient menstruum was added to make the required 225 c.c. of the finished product.

In the second formula a menstruum of 2 parts alcohol and 1 of water was used as follows :

Yerba santa in No. 60 powder.....	225 gm.
Alcohol.....	150 "
Water.....	75 "

To make 225 cc. of the finished product.

The details of the manufacture of this extract are identical with those of the first formula, except that 150 c.c. more menstruum were added to exhaust the drug instead of 140 c.c., as in the former case.

A comparison of the two processes would seem to indicate a preference for the first formula.

The residue of the first formula was found to be odorless, tasteless, and almost colorless, whilst that of the second formula still retained a slight odor and taste of the drug, which would indicate that it was not entirely exhausted, hence the extract could not contain as much of the active principle of the drug as that made by the first formula, both processes being conducted with the same care and attention.

The fluid extract made by the first formula had a peculiar odor, a dark olive-green color, and possessed an astringent and strongly bitter taste, whilst that obtained by the second formula had about the same odor, but it was much lighter in color, and lacked a deal of the astringency and bitterness which was found in the former.

The investigations seem to show clearly that a menstruum of 3 parts alcohol and 1 part water is much better for completely exhausting the active principles of the drug.

The alcohol which was recovered in the process of distillation had a strong odor of the drug, and, in order to purify it, 5 grs. of permanganate of potassium were added, and the whole allowed to stand for forty-eight hours, after which it was re-distilled. This distillate was converted into diluted alcohol by adding the required quantity of water. By this process a product was obtained which had but a faint odor of the drug, and the liquid could be used for many purposes.

Pereirine hydrochlorate as a substitute for quinine in cases of malarial fever is highly recommended by Ferreira, of Brazil (*Bull. gén. de thérap. ; Med. Chronicle*). To a child, who could not take quinine, had been given two doses of fifteen grains of the pereirine salt, half an hour apart, and after a repetition of like doses, the next day, rapid recovery took place, with no further attacks.

ANALYSIS OF THE LEAVES OF EUPATORIUM PERFO- LIATUM.

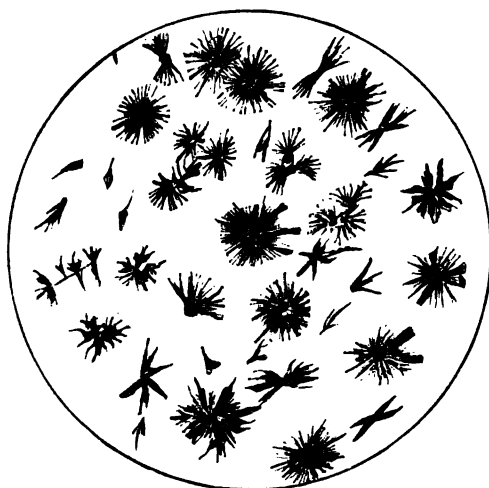
Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

By F. W. FRANZ.

Read at the Pharmaceutical Meeting, January 17.

The leaves of this plant, as far as I have been able to find out, have never been analyzed before, although the herb has frequently been.

A bitter principle was first isolated, by G. Latin, in 1880, from the ethereal extract of the herb by means of chloroform, and was named eupatorin. This principle was found, during my own investigation, in the petroleum spirit extract and was separated by repeatedly digesting in water. The coloring matter was removed by digesting the solution in absolute alcohol with animal charcoal and when evaporated



over sulphuric acid needles were obtained, very bitter and nauseous.

An aqueous solution of the principle gave the following reactions:

Fehling's solution was reduced when boiled for some time, due probably to impurities.

When heated with dilute hydrochloric acid a distinct raspberry-like odor was produced, and the liquid soon became cloudy; this was filtered, made slightly alkaline and Fehling's solution added which was soon reduced, thus showing it to be a glucoside soluble in water, alcohol, chloroform and ether.

Wax.—This was obtained by treating the residue, after the separation of the eupatorin, with stronger ether, whereby a white substance was separated and crystallized from petroleum spirit, in white, tasteless, acicular crystals.

Absolute alcohol dissolved a portion of these which on evaporation became yellow, insoluble in 95 per cent. alcohol and melting at 95°C.

The insoluble portion was recrystallized from petroleum spirit in white tasteless crystals, as shown by the drawing, but which on warming became yellowish, melting at 145°C., not affected by sulphuric acid or aqueous and alcoholic solution of potash, but soluble in glacial acetic acid, reprecipitated on the addition of water.

Mr. Latin also obtained a crystalline principle from the ethereal extract of the herb, by means of benzin, but speaks of it as having a low fusing point.

Volatile Oil.—About 2lbs of the fresh leaves were distilled with water; the distillate being slightly cloudy was shaken with petroleum spirit, separated and evaporated, showing a very small amount of volatile oil having the odor of the fresh leaves.

Summary of the analysis made according to Dragendorff's scheme:

Ash (potassium, calcium, iron, and silica)	7.5 per cent.		
Moisture		9.40 per cent.	
<i>Petroleum spirit extract :</i>			
Volatile oil,	0.01	"	
Resin,	0.80	"	
Wax, { a portion melting at 95°C.			
" " " 145°C.	2.60	"	
Eupatorin, (in small amount),			
Chlorophyll and undetermined resinous substances,	—	6.19	"
<i>Ethereal extract :</i>			
Gallic acid,	1.50	"	
Resin and some chlorophyll,	6.80	"	
	—	8.30	"
<i>Alcoholic extract :</i>			
Tannic acid,	5.60	"	
Undetermined substances,	3.12	"	
	—	8.72	"
<i>Aqueous extract :</i>			
Mucilage and sugar,		20.86	"

Dilute soda extract :

Albuminoids and mucilage,	8.00 per cent.
Lignin,	3.82 "
Intercellular substances,	21.86 "
Cellulose,	9.31 "
Ash, (silica)	0.59 "
Loss,	2.95 "
	— —
	100.00

THE BITTER PRINCIPLE OF BURDOCK FRUIT.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

By HENRY TRIMBLE.

In the AMERICAN JOURNAL OF PHARMACY for 1885, page 127, is an account of the proximate analysis of burdock fruit, by Mr. J. D. MacFarland and myself, in which it was stated that the bitter principle, then believed to be an alkaloid, would be further investigated. Since then as time has permitted I have reviewed the work until an entire re-analysis has been completed. The results differ in no important particular from those recorded then, except in the character of the bitter principle.

The absolute alcohol extract has been found now as then, to consist of a little resinous substance, somewhat soluble in water, and completely soluble in dilute alcohol. A large quantity of the desired material was prepared by exhausting the drug with petroleum spirit to remove fixed oil, and then with alcohol. On pouring the concentrated alcoholic solution into water the resin separated, but the bitter principle dissolved in the water, from which it was readily removed by agitation with chloroform. The residue on evaporating the chloroform was treated with water, and the clear aqueous solution allowed to evaporate in a desiccator over sulphuric acid, when a white granular crystalline substance separated. This may be further purified by resolution in water and again evaporating in a desiccator. The purified material is pure white, of an intensely bitter taste, and has a neutral reaction. On testing for alkaloids, negative results are gotten. Fehling's solution is not reduced, but on first boiling with very dilute hydrochloric acid for fifteen minutes the solution becomes cloudy, and finally a resin separates which appears to be identical with the resin obtained on pouring the alcoholic solution into water ; now when the clear filtrate

from this resin is tested with Fehling's solution for glucose, decided evidence of it is obtained.

It is evident that the bitter principle is a glucoside, which, on boiling with dilute acid, decomposes into the resin, which is soluble in alcohol and sugar. Having more definitely determined the character of the bitter principle and exhibited a distinct quantity of it in crystalline form, I hope soon to investigate its composition and properties more fully.

MERCURAMMONIUM CHLORIDES.

Contribution from the Chemical Laboratory, Philadelphia College of Pharmacy.

BY FRANK X. MOERK, Ph.G.

Read at the Pharmaceutical Meeting, January 17.

In pharmaceutical and chemical text-books mention is made of three compounds derivable from the formula of ammonium chloride, by the introduction of dyad mercury in place of hydrogen.

Mercurammonium chloride NH_2HgCl , the official Ammoniated Mercury, or commonly known as "infusible white precipitate," is a compound in which an atom of dyad mercury replaces two hydrogen atoms in one molecule of ammonium chloride, NH_4Cl . This is gotten by the addition of mercuric-chloride solution to an excess of ammonium hydrate, or, by adding the hydrate, in excess, to the mercuric-chloride solution; in either case, the precipitate gotten is washed with a limited quantity of water containing ammonium hydrate. By prolonged washing, or by boiling with water, this compound is decomposed into hydrated dimercurammonium chloride and ammonium chloride. $2 \text{NH}_2\text{HgCl} + \text{H}_2\text{O} = \text{NHg}_2\text{Cl.H}_2\text{O} + \text{NH}_4\text{Cl}$.

Mercurdiammonium chloride $(\text{NH}_4\text{Cl})_2\text{Hg}$, or "fusible white precipitate," is derived from two molecules of ammonium chloride by the replacement of two hydrogen atoms, one from each molecule, by one atom of dyad mercury. It is formed by the addition of mercuric chloride solution to a boiling solution of ammonium chloride, containing ammonium hydrate until the precipitate first formed ceases to redissolve; on cooling, the salt of the above formula crystallizes. This is a method not likely to be followed by the manufacturing chemist in making ammoniated mercury, on account of the waste of ammonium salts and the loss of the mercury compound, which is soluble in ammonium chloride. Another method is the precipitation of a solution containing equal

parts of mercuric and ammonium chlorides, by addition of sodium-carbonate. Nothing is stated regarding the action of water upon this compound.

Dimercurammonium chloride hydrated, $\text{NHg}_2\text{Cl} \cdot \text{H}_2\text{O}$ is theoretically gotten by the introduction of two dyad mercury atoms in place of four hydrogen atoms in a single molecule of ammonium chloride. It is described as a yellowish or a yellow granular compound, convertible into a white powder by a solution of ammonium chloride, and is obtained by boiling the mercurammonium chloride with a large excess of water. If this is boiled with potassium hydrate, it is converted into dimercurammonium hydroxide while potassium chloride is formed: $\text{NHg}_2\text{Cl} + \text{KOH} = \text{NHg}_2\text{OH} + \text{KCl}$.

With a view of studying more especially the first two compounds as to the best methods of commercial preparation, the action of heat upon them as applied to the precipitation from cold and boiling solutions, if possible, to devise a test by which they could be easily distinguished, and lastly, a ready method of analysis, a series of experiments were made.

A number of specimens were made, and these, after analysis, can be divided into four classes:

- I. Formula NH_2HgCl .
- II. Mixtures of NH_2HgCl and $(\text{NH}_3\text{Cl})_2\text{Hg}$.
- III. Formula $\text{NHg}_2\text{Cl} \cdot \text{H}_2\text{O}$.
- IV. Formula NHg_2Cl .

All of the specimens under I. and II. were washed, after placing them in small percolators, with 2 portions of dilute ammonia water (1-20) of 20 cc. each: after draining they were pressed between sheets of filter-paper to remove excessive moisture, and dried in an oven at a temperature between 30° and 40°C .

Specimens under III. and IV. being decomposition products, were simply washed with water and dried as above.

I. *a* Made by the U. S. P. process.

I. *b* By boiling for thirty minutes, after adding the ammonium hydrate in excess to solution of mercuric chloride.

II. As the compounds NH_2HgCl and $(\text{NH}_3\text{Cl})_2\text{Hg}$ differ by one molecule of ammonium chloride, it was considered possible to form the latter by precipitating mercuric-chloride solution, in presence of excess of ammonium chloride, by ammonium hydrate.

The filtrate obtained in the preparation of the specimens under II.

contained more mercury than those under I., due to the solvent power of ammonium chloride upon the compounds formed.

II. *a.* The above supposition carried out in the cold with a solution containing 2 parts mercuric chloride to 1 part ammonium chloride.

II. *b.* The same at the boiling temperature.

II. *c.* Is the product gotten by the action of sodium carbonate, in slight excess, on equal parts of mercuric and ammonium chlorides, no heat being applied.

II. *d.* The above at the boiling temperature.

II. *e.* Boiling the above for thirty minutes.

III. Represent the decomposition products of I., which have the formula NH_2HgCl , by boiling with large quantities of water. If boiled with water after washing they give very pale, yellowish-white precipitates, having the composition $\text{NHg}_2\text{Cl} \cdot \text{H}_2\text{O}$; boiled with water containing ammonium chloride, as is the case if not previously washed, I. may be converted entirely or in part into the anhydrous compound NHg_2Cl .

III. *a.* Decomposition product of I. *a.*

III. *b.* Same, but I. *a.* washed for a week with cold water without thorough decomposition, finally boiled with water.

IV. Are decomposition products of II. While experimenting with these it was noticed that if the mixture containing the precipitate was boiled for a time, the liquid decanted and the precipitate then boiled with several portions of water, a deep yellow powder was obtained; while if the mixture was placed aside until cold, filtered, the precipitate washed and then boiled with water, a lighter colored powder was obtained. This was attributed to the presence of ammonium chloride which possibly changed the mercurammonium chloride, yielding a whitish decomposition product, into mercurdiammonium chloride yielding a deep yellow decomposition product. To prove this a portion of I. *a.* was taken and boiled for a few minutes with a little ammonium chloride; on subsequent decomposition the product was of a distinct yellow color, showing that at least a portion had been changed. The deep yellow colored compound is the anhydrous dimercurammonium chloride, and can also be made from the hydrated by heating to 100°C .

IV. *a.* Product of II. *a.*, with washing before decomposition.

IV. *b.* " " II. *a.*, without " " "

IV. *c.* " " II. *d.*, " " " "

The tests applied to the above preparations were :

1. *Color.* I. and II. were white; III. white with tinge of yellow; IV. yellow.

2. *Fusibility.* Of the specimens made only those in class II. were fusible; of these, *c*, *d* and *e* were more fusible than *a* and *b*, which were only partially so. It has been stated that owing to the decomposition of infusible white precipitate by washing with water, the U. S. Pharmacopœia did not require thorough washing and that if the ammonium chloride remaining in the product equalled 7 to 8 per cent. the mixture would become partially or wholly fusible. The presence of this quantity of ammonium chloride would be sufficient to form 40 to 50 per cent. fusible precipitate from the infusible. The amount of ammonium chloride formed in the U. S. Pharmacopœia process is somewhat less than 2 parts, and as there are over 200 parts of liquid (water) present it should be possible to remove at least three-fourths of this without washing. By washing, at least one-half of the remaining liquid should be displaced, and, without allowing for the additional quantity removed by pressing between bibulous paper, there is left only one-eighth of the original quantity of ammonium chloride, which is 0.25 of 1 part, or, expressed in percentage to the yield of white precipitate, 2.6 per cent. By careful washing and drying between filter paper it should be possible to bring this to less than 1 per cent., which is not sufficient to show any signs of fusion.

3. *Solubility in hydrochloric acid.* Common to all, slowly in the cold, easily on application of heat.

4. *Action of potassium hydrate.* This caused the evolution of ammonia from I. and II., and a yellow color in I., II. and III. No odor of ammonia was perceptible with III. and IV., and litmus paper failed to indicate more than traces; these compounds do not decompose into ammonia, mercuric oxide and potassium chloride, as is the case with I. and II., but are changed into the hydrate corresponding to the chloride, or dimercurammonium hydrate, the chlorine uniting with the potassium to form potassium chloride. In Attfield's Chemistry is the statement that NH_2HgCl on washing was changed into a compound of mercurammonium chloride and mercuric oxide $\text{NH}_2\text{HgCl}, \text{HgO}$; on examination this is seen to be equal to $\text{NHg}_2\text{Cl}, \text{H}_2\text{O}$, but I doubt its correctness, as mercurammonium chloride will liberate ammonia on addition

of KOH, while the compound resulting from its decomposition will not.

5. *Action of boiling water.* This reacts only with I. and II., and is explained under IV. If a pure NH_2HgCl is boiled with water a whitish product is obtained, while if the NH_2HgCl is contaminated with either mercurdiammonium chloride or ammonium chloride, a pale or deeper yellow is obtained, depending upon the quantity present.

6. *Action of potassium iodide.* I. and II. changed at once to a yellow or red color, III. to a purple, IV. slowly to a brown. On heating they finally took a purple color, while ammonia was freely given off.

7. *Action of sodium thiosulphate.* Were all slowly soluble in a cold solution and, on boiling, deposited black mercuric sulphide. Ammonia vapors were evolved.

8. *Action of ammonium chloride.* The samples were soluble in a boiling solution of the above, III. and IV. first becoming pure white precipitates, showing the change of the dimercurammonium chloride into either the fusible or infusible white precipitates; the former is more apt to be the one, for the ammonium chloride was in excess. This change takes place simply by the addition of one or three molecules of ammonium chloride.



9. *Action of acetic acid.* On reading over the tests of the U. S. P. one is apt to receive the impression that the officinal ammoniated mercury is easily soluble in the above acid, but such is not so. All of the specimens examined were but sparingly soluble, I. and II. dissolved upon moderate warming in a considerable quantity of acid; but if this solution is boiled a very peculiar reaction occurs, the mixture becomes turbid, and there is precipitated from the boiling solution a white granular powder. This, after filtration and washing, was found to turn dark on boiling with hydrochloric acid, caused by separation of metallic mercury, and the acid solution, after filtering, showed the presence of mercuric chloride; tested by the addition of ammonium and potassium hydrates the white powder turned black. These tests prove the nature of the precipitate; it is mercurous chloride, or calomel. The filtrate from the calomel contained a trace of mercurous salt, as a turbidity was occasioned by the addition of hydrochloric

acid; the addition of ammonium hydrate after the separation of the mercurous trace, caused only a faint turbidity, but potassium iodide yielded a copious precipitate, showing the presence of mercuric salt in the acetic acid solution, and the solubility of ammoniated mercury in ammonium acetate solution. III. and IV. did not dissolve in the acid, but after boiling for a few minutes and filtering, the filtrate with KI indicated the presence of mercuric salt. The insoluble portion was yellow, and on addition of hydrochloric acid the greater part dissolved, leaving a small quantity of a white powder which, on addition of potassium and ammonium hydrates, blackened, the tests for calomel. Mercuric chloride boiled with acetic acid for a few minutes becomes turbid, and a precipitation of calomel occurs, and for this reason the mercurammonium chloride acts in the same way.

The analysis of the specimens was first attempted by boiling with KOH, which was supposed to liberate ammonia; this could be estimated volumetrically, the residue weighed as mercuric oxide, while the filtrate contained the chlorine which could be precipitated by silver nitrate after acidification with nitric acid. III. and IV. failed to yield ammonia by heating with potassium hydrate, and as nitrogen could be detected by other reagents, as potassium iodide and sodium thiosulphate liberating ammonia, this scheme was supplanted by the following one, even more simple:

1 gm. of the sample is mixed with 20 c.c. water and 1 c.c. hydrochloric acid, hydrogen sulphide is then passed through the mixture until this smells strongly of the gas, after slight warming and allowing to stand for half an hour. This part can be expressed by the reactions:

1. $\text{NH}_4 \text{Hg Cl} + \text{H}_2\text{S} = \text{NH}_4 \text{Cl} + \text{HgS}$.
2. $(\text{NH}_4 \text{Cl})_2 \text{Hg} + \text{H}_2\text{S} = 2 \text{NH}_4 \text{Cl} + \text{HgS}$.
3. $\text{NHg}_2 \text{Cl} + 2 \text{H}_2\text{S} = \text{NH}_4 \text{Cl} + 2 \text{HgS}$.

The sulphide of mercury is transferred to a weighed filter, the filtrate collected in a tared beaker and after evaporation on a water-bath, both filtrate and filter are dried at 100°C , and weighed.

The percentages of Hg, HgS and $\text{NH}_4 \text{Cl}$ obtainable from the different compounds follow:

	$\text{NH}_4 \text{Hg Cl}$	$(\text{NH}_4 \text{Cl})_2 \text{Hg}$	$\text{NHg}_2 \text{ClH}_2\text{O}$	$\text{NHg}_2 \text{Cl}$
Hg	79.53	65.61	85.56	88.99
Hgs	92.27	76.09	99.27	103.25
$\text{NH}_4 \text{Cl}$	21.26	35.07	11.44	11.90

The analyses of the specimens may be tabulated as follows :

	HgS.	NH ₄ Cl	
I a.	92.20	21.20	} NH ₂ HgCl.
b.	92.05	21.60	
			26.02 % NH ₂ HgCl.
II a.	80.30	31.50	73.98 % (NH ₃ Cl) ₂ Hg.
b.	83.80	29.20	} 47.65 % NH ₂ HgCl.
c.	83.80	29.00	
			52.45 % (NH ₃ Cl) ₂ Hg.
			19.84 % NH ₂ HgCl.
d.	79.30	32.00	80.16 % (NH ₃ Cl) ₂ Hg.
			48.88 % NH ₂ HgCl.
e.	84.00	—	51.12 % (NH ₃ Cl) ₂ Hg.
III a.	99.40	—	} NH ₂ ClH ₂ O.
b.	99.60	11.00	
IV a.	100.30'	12.00	} Mixtures of NH ₂ ClH ₂ O and NH ₂ Cl.
b.	102.20	12.20	
c.	102.40	—	

The results of the experiments may be summed up as follows: Mercurammonium chloride is produced by the addition of ammonium hydrate in excess to a solution of mercuric chloride, as well as by the U. S. P. process. If the ammonium hydrate be added to a boiling solution of mercuric chloride, the above compound will separate as a granular quickly subsiding powder, easier washed than the U. S. P. product. Mercurdiammonium chloride is not gotten pure by the method asserted to yield it, that is by the precipitation of the solution containing the chlorides of mercury and ammonium with sodium carbonate. What is gotten is either a mixture of mercurammonium with mercurdiammonium chloride, or else a double salt of mercurammonium chloride and ammonium chloride, of varying composition. The product nearest approaching in composition that of mercurdiammonium chloride was gotten by using a boiling solution of the chlorides, and adding the sodium carbonate, allowing to stand until effervescence ceased, and filtering and washing.

Supposing these products to be a mixture of NH₂HgCl and (NH₃Cl)₂ Hg, the percentage of the former can be gotten by subtracting from the percentage of mercuric sulphide, yielded by the sample, 76.09, and dividing the remainder by 0.1618.

Tests to show presence of mercurdiammonium chloride or ammo-

nium chloride in mercurammonium chloride are, firstly, fusibility, which will detect larger quantities, and secondly, the decomposition product by boiling the specimen with large quantities of water, one part precipitate to one hundred parts, repeated twice. If the specimen be pure, only the faintest shade of yellow should tinge the precipitate.

An analysis which undoubtedly is the best method of determining either of the above compounds, is best carried out as given in the analysis of samples. The amount of mercuric sulphide obtained should equal 92.27 % of the sample taken, a smaller percentage proving admixture.

AN EXAMINATION OF CASCARA SAGRADA.

By H. F. MEIER AND J. LEROY WEBBER.

In addition to what has been already ascertained in regard to the chemical composition of the bark of *Rhamnus purshiana*, we desire to contribute the following: A summary of existing knowledge as to its constitution may be found in THE AMERICAN JOURNAL OF PHARMACY for 1879, p. 165, by Prof. Prescott. Passing over the microscopical examination, it appears that there have been recognized among its constituents three resins—a brown, red and yellow resin, respectively; 4, a crystallizable body; 5, tannic acid; 6, oxalic acid; 7, malic acid; 8, a fat oil; 9, a volatile oil; 10, wax; 11, starch.

In addition to what has been above enumerated, we may refer to a note in the *Pharmaceutical Journal and Transactions*, 1885, p. 615, wherein Mr. Limousin expressed the opinion that the resinous bodies, separated by Prof. Prescott, were all more or less derived from chrysophanic acid, which he has observed to be present in it in notable quantities.

In the same journal, 1886, p. 918, there is a reference to a substance, received by Prof. Wenzell, with an examination thesis. It is described as of a deep orange-red color, a glucoside, differing entirely from frangulin and emodin. This description is somewhat fuller than the one given in the AMERICAN JOURNAL OF PHARMACY for 1886, p. 252. In the latter journal it is stated that the principle will be further examined by Prof. Wenzell.

We have found after an exhaustive examination, and abundantly verified the presence of, three other bodies whose influence, both in a pharmaceutical and physiological sense, is of decided importance. We would name here, 1st, a ferment; 2d, glucose; 3d, traces of ammonia.

The ferment alluded to, seems to be identical with that existing in numerous other vegetable substances. While the isolation and ultimate analysis of this element must of necessity be deferred for some time, owing to the difficulty of obtaining it in a state of purity, yet we may say, unhesitatingly, that its effects are identical with those of the principle existing in cabbage, licorice root, in frangula and, undoubtedly, in many other vegetables. Its presence in frangula does not seem to have been suspected hitherto, nor has its range of possibly mischievous action been fully appreciated. That this ferment, as it exists in cascara, is capable of producing griping or epigastric pain, we have absolutely demonstrated. The necessary steps have also been taken to obtain a supply of fresh frangula bark, in order to decide the question absolutely, as we are convinced that it is this ferment in the fresh bark which causes the undesirable results. The process appears to us very simple. If the undestroyed ferment be administered along with the laxative ingredients, as would be the case in a cold infusion, the identical results follow as in the bark itself, that is, a generation of free acid, which in the case of the stomach would undoubtedly be lactic acid, and prove an unwelcome visitor when produced in abnormal quantities. In substantiation of this view, we beg to quote Bartholow (*Materia Medica and Therapeutics*, p. 69): "In large doses (1 drachm) it (lactic acid) gives rise to epigastric pain, flatulence and loss of appetite." How important a recognition of this fact is to the scientific physician will be readily appreciated, inasmuch as a great deal of unnecessary pain and suffering may be prevented. Its importance in a pharmaceutical sense will be recognized by those interested when we state that we have demonstrated that the ferment in question is operative, as far as we are concerned, from the moment that the bark is removed from the tree. It will follow, therefore, that a continuous decomposition and change is going on in this bark, as well as in frangula. The means of removing the difficulty, and of obtaining a permanent bark which retains all of the medicinal activity in the highest degree will be at once apparent, thereby enabling us to secure from decomposition the principle next to be considered, and render the bark absolutely permanent. A few references may not be amiss, in order to indicate how near at hand a recognition of this substance should have been. Quoting from the *AMERICAN JOURNAL OF PHARMACY*, 1871, p. 457, H. C. Baildon, of Edinburgh, states that "I have repeatedly taken the decoction myself without griping," and

from the tenor of his communication we should conclude that he had been using recent bark. In the same journal, 1876, p. 319, there is an account of a very anomalous behaviour of the fresh bark, and the statement is also made by Fristedt that the recent bark produces colic and vomiting. We have already indicated the cause of the difficulty, and believe that we shall shortly be able to explain why the fresh bark is inefficient, as here noted, in addition to producing the disagreeable effects.

The existence of this ferment may be easily demonstrated to the satisfaction of even the most skeptical investigator in a very simple manner. A cold aqueous percolate from four ounces of the bark of *Rhamnus purshiana*, to the pint, is divided into two equal portions, and both exactly neutralized with sodium bicarbonate. One portion is now to be boiled or exposed in a flask to the heat of boiling water for at least a half-hour. That a temperature must be used, capable of destroying this ferment, is evident, when the object in view is considered. The addition of a little yeast, to both the infusion and cooled decoction, will illustrate the matter admirably. In the decoction the vinous fermentation alone progresses, while in the infusion a gradual departure from neutrality will be observed, and with increasing acidity a precipitation of the resins, previously held in solution as sodium compounds.

The glucoside referred to seems to be peculiar to *Rhamnus purshiana*, as we have been unable to determine its presence in the frangula bark, as it occurs in commerce. This glucoside, though having very important functions and properties, has hitherto escaped a deserved recognition. A further examination of the fresh bark will, we think, confirm the existence of a remarkable difference between these two barks, inasmuch as experience has demonstrated that *Rhamnus purshiana* exerts a decided and unmistakable tonic effect, we are inclined to ascribe these properties to the bitter, crystallizable principle already spoken of. Physiological tests to determine the actual properties, not only of the bitter substance, but of the comparative laxative power of the different resins, are under way. The glucoside may be obtained in a comparatively pure state for examination by precipitating an aqueous infusion or percolate from cascara with sub-acetate of lead. After removal of the excess of lead by H_2S , the solution exhibits a remarkable decomposition, when boiled with sulphuric, hydrochloric, or lactic acid. The solution becomes intensely bitter, turbid on cooling,

and a microscopical examination indicates the presence of a substance, insoluble in water, of an oily or resinous behaviour, and also crystals of the bitter substance referred to. This oily, or resinous body, seems to be an excellent solvent for the bitter principle, inasmuch as on cooling, fine crystals may be seen distributed through it. It is evident from the behaviour of this solution that the ferment has been separated, and it is, therefore, precipitable by sub-acetate of lead.

We do not wish to be understood as supposing or claiming that this ferment acts directly in producing a decomposition of the glucoside, because such is not the case. The ferment simply is instrumental in generating vegetable acids, and these latter are the direct agents engaged in the decomposition. A great step in advance will have been made also, by the recognition of the fact that these changes can take place in the cold, at ordinary temperatures, in the human stomach, in the percolator, and even in the air-dried bark itself, the latter to all appearances being in a decidedly quiescent condition. We must not forget that all the conditions are present, even to the extent of the necessary moisture.

An ultimate analysis of the glucoside as well as the bitter principle will follow shortly.

The glucose, which is present in varying proportions, according to the age of the bark, plays a very important part in the pharmacy of cascara. As a medicinal agent it is certainly inert in common with vegetable albumen, the starches, etc., and is even capable of producing much mischief by undergoing the process of fermentation under favorable conditions. That the glucose is the active element in producing the very undesirable "falling," as referred to by Mr. Butterfield, in the *Pharmaceutical Journal and Transactions*, 1887, p. 473, is very evident; that an extract containing a liberal quantity of glucose may, in the process of manufacture into a pill, gather on its surface a small army of ferment germs with the natural result, will not be denied. The glucose decomposes into alcohol and carbonic acid, and it is not a matter of wonder that the pills get soft. It may be possible to destroy these germs by the application of an alcoholic varnish, but we would respectfully submit our opinion that it would be a much more scientific method to remove the inert glucose and avoid the presentation of bullets.

The traces of ammonia which we have been able to find remaining in the bark, indicate to us that this ingredient has undoubtedly a distinct function, which appears to us as that of rendering the resins solu-

ble and transportable for the purposes of the plant. In this respect we think it very analogous to licorice root, inasmuch as careful observers have already noted the absence from old licorice root of the sufficient amount of ammonia, to render the glycyrrhizin, or sweet principle entirely soluble in water, and have even advised replacing it by exposing the root to the vapors of ammonia in a suitable closed vessel. We beg to refer in this connection to the statements of Dr. Hager, in his "Handbuch der Pharmaceutischen Praxis," p. 664, Supplement, quoting Prof. Landerer on this subject. While ammonia may be the active agent, or base in the plant itself, and which we propose to determine by an examination of the fresh bark, we are convinced that for pharmaceutical purposes other alkaline bases are preferable. It is difficult to concentrate by evaporation a neutral, ammoniacal extract from either licorice or cascara without loss of a decided quantity of the volatile alkali, inasmuch as the organic acids seem to have but a feeble affinity for it, insufficient to resist the dissociating action of the temperature employed in evaporation. Like results would undoubtedly follow an attempted concentration of some other salts of ammonia with organic acids, as for instance, the endeavor to reduce volatile liniment to a solid form.

A full report will follow of the result of experiments directed at the solution of a number of questions of importance; among these questions is one addressed to the immediate source of the acid produced by the action of the ferment; whether it be glucose, albumen, or amyloids, alone or together. Another matter we have undertaken to determine is the part played by the ferment, its mode of action, and the reason for its final exhaustion. This involves a determination of what becomes of it while engaged in its occupation.

We believe also to have a right to expect that some light will be thrown on the formation of the resins themselves in the plant, and that an important natural process may thus be understood. The very existence of glucose itself in the bark is to us an evidence of a preceding glucosic fermentation. That this is continually going on in the apparently inactive bark, we have already shown. The mode of action of the bark of cascara, and which we have carefully studied, leads us to assume that the laxative properties are inherent in the resins, while the tonic effects are undoubtedly due to the crystalline bitter principle. That the bark is both laxative and tonic, and decidedly so, does not admit of further question, in spite of frequent denials.

It is very evident that an analysis of any plant which attempts to give the exact proportions of all its constituents, such as the percentage of its various ingredients, cannot be accepted as authoritative or as indicating the composition of any other specimen of such plant, except the one directly under consideration. It appears to us more important to establish the average quantity of medicinally active ingredients from the best representative specimens of vegetable drugs obtainable, because such a knowledge admits of a practical application to the establishment of a standard and for purposes of assay, so that uniform pharmaceutical products may be obtained. From what we have already demonstrated, it will be seen that an assay of the bark, obtained in a fresh condition, cannot tally exactly in its results with one arrived at from a sample of aged bark, in which decomposition processes have been going on since its removal from the plant.

DETROIT, Laboratory of Parke Davis & Co.

FLUID EXTRACT OF CASCARA SAGRADA.

EDITOR AMERICAN JOURNAL OF PHARMACY:

SIR:—After having tried all published formulas for the extract of cascara sagrada that came under my observation, and finding them deficient in preservative properties, that is, the extracts all precipitated heavily after a few weeks, I endeavored to find a more suitable menstruum for the drug, and believe I have succeeded. With this note you will find a specimen of the fluid extract remaining clear after six months' standing, and prepared by the following process:

Drug in No. 60 powder.....	1 lb.
Alcohol.....	1½ pta.
Water.....	½ pt.

Moisten and pack in percolator; macerate for forty-eight hours, collect the first 13 fluid-ounces, evaporate the remainder to 3 ounces, and mix with the reserved portion.

Among the many readers of the Journal some may have had the same trouble with cascara, which may be avoided by using the above menstruum.

GERMANTOWN, Philadelphia, Jan. 23, 1888.

Yours, etc.,

WM. BICHY.

ANALYSIS OF RICINUS COMMUNIS.

BY ADDISON LLOYD BECK, PH.G.

From an Inaugural Essay.

This plant is a native of India, and in tropical countries attains a height of forty feet; in warm temperate regions it is a woody branching bush, twelve to fifteen feet high, and in this climate it is an annual herb of variable sizes, according to the care and cultivation, and protection of the young plants in early spring time. When grown in its native climes it seeds well for six years, then ceases to bear and dies off. It is successfully cultivated in different parts of the world, chiefly for the oil found in the seeds, but other uses are made of the different parts of the plant. The records note that it was introduced into Italy and the United States about the same time, in the year 1855,¹ and continues to be largely cultivated in this country, especially in Illinois and other western States. In 1867 experiments were tried in California with success; the plants grew luxuriantly, and gave a large yield of seeds, but the expense of gathering the crop was so great that its continued cultivation did not assume commercial importance.

The uses of the castor-oil plant are numerous. The oil expressed from the seeds, aside from its demulcent and purgative properties as a medicine, is largely used as a lubricant for machinery and as a dressing for preserving and softening leather; also in dyeing and printing. It is largely used in India as a lamp oil, giving an excellent white light with but little soot.

The oil cake is used as a manure, and in India for making illuminating gas.² The leaves of the plant form the food of the silk spinning bombyx (see AMERICAN JOURNAL OF PHARMACY, 1855, p. 110), and are used medicinally as a galactagogue (*Ibid.*, 1851, p. 176), and in India also, for the cure of rheumatism by warming or sweating them, and binding on the parts affected. According to Mr. Rafford (*Ibid.*, 1883, p. 422), flies disappear from a room in which castor-oil plants have been placed; and it has been recently suggested that the dried and powdered leaves be used as an insect powder. The objec-

¹ According to a paper by Prof. Procter, published in AMERICAN JOURNAL OF PHARMACY, 1885, p. 99, the crop of ricinus seeds in Illinois and Missouri, in 1850, was 250,000 bushels, and yielded 350,000 gallons of oil.—EDITOR.

² It has also been recommended for the destruction of insects, and the cultivation of the plant in saffron beds is said to protect the latter against mice. See AMERICAN JOURNAL OF PHARMACY, 1875, p. 233.—EDITOR.

tions to this use, however, would be the dark color of the powder and the disagreeable odor of the plant.

The dried plant, including the roots, is used for fuel (*Ibid.*, 1867, p. 59), and the natives of upper India find an excellent use for the wood as a building material for thatching their homesteads of mud walls, its chief recommendation being its immunity from attack of white ants and other insects. The wood makes an excellent paper pulp. Bees infest the castor plant when in flower, and an abundant supply of honey may be obtained from a castor plantation.

PROXIMATE QUANTITATIVE ANALYSIS.

The analysis of the plant was made in the new chemical laboratory of the Philadelphia College of Pharmacy.

The root, stem and leaves were each reduced to No. 80 powder, and treated by the method proposed by Dragendorff, except that the powder was thoroughly exhausted by successive portions of the different solvents, as well as other modifications suggested by Prof. Trimble.

Leaves.—Five grams of the powder on drying at 110° C. to constant weight, showed moisture 12·7 per cent., and the same portion ignited left 11·22 per cent. of ash, of which 5·62 per cent. was soluble in water; 4·81 per cent. soluble in HCl, and 0·79 per cent. insoluble in both liquids. A qualitative examination showed the presence of potassium, calcium, magnesium, and traces of iron and manganese, with carbonic, phosphoric and sulphuric acids.

Fifty grams of the powder were extracted with petroleum spirit which, on evaporation, left a dark, semi-fluid residue of disagreeable odor, amounting to 4·58 per cent., which on heating to 120° C. lost 0·254 per cent., was deprived of smell, and was considered volatile oil which was verified by distillation from another portion of the drug, separating the oil from the distillate by agitating with petroleum spirit, and allowing the latter to evaporate, when a small portion of the oil remained, having the disagreeable odor of the freshly bruised leaves.

The following are the chief characteristics of the petroleum extract: Semi-fluid and does not solidify at 0° C.; dark-green in color; specific gravity. about .9089; permanent grease spot on paper; partly soluble in H₂SO₄ and glacial acetic acid, and slightly in HNO₃; chloroform, ether, benzol and carbon disulphide dissolve it completely, and alcohol 2·57 per cent.

On treating a portion with a strong solution of NaOH, no evidence of saponification was obtained.

In the effort to purify this extract it was found that by treating a portion with an alcoholic solution of sodium hydrate, adding an equal volume of water and agitating with petroleum spirit, and evaporation of the same, an orange-red wax, soft and liquid at 27° C., was obtained. The alkaline residual liquid was then acidified and again agitated with petroleum spirit, which on evaporation left a dark residue that melted at about 87° C., which proved to be a resin similar to that obtained in the ether extraction.

A portion of the purified wax was treated according to the scheme proposed by E. Hirschsohn for the identification of waxes (AMERICAN JOURNAL OF PHARMACY, 1880, p. 303). The solution on cooling remained clear, and an alcoholic solution of ferric chloride neither gave a precipitate nor colored the solution, showing that it differed from the waxes mentioned by him. Its light specific gravity would distinguish it also, as well as its low fusing point.

The powder was then extracted by stronger ether, and a portion evaporated, showing residue amounting to 2.575 per cent., which melted at 91° to 93° C. It was entirely soluble in chloroform, benzol and carbon bisulphide. Absolute alcohol dissolved 2.02 per cent. of resin. When tested for alkaloids and glucosides negative results were obtained.

The tincture obtained by exhausting the powder with absolute alcohol was reduced by distillation at a low temperature by means of a vacuum, to 200 c.c. Two portions of 20 c.c. each, were evaporated to dryness and 3.12 per cent. of extract obtained, which on ignition left 0.15 per cent. of inorganic matter. The extract was soluble in water to the extent of 2.58 per cent. The remaining 160 c.c. was evaporated to dryness, and redissolved in water, filtered, and made up to 160 c.c. and divided into eight portions of 20 c.c. One portion, precipitated with ammoniacal zinc acetate, washed, dried and ignited, indicated 1.008 per cent. of tannin. Another portion treated by solution of neutral lead acetate, gave the same results. Other portions were found to contain small amounts of glucose and saccharose. One portion was made slightly acid and agitated successively with petroleum spirit, benzol, and chloroform, then made alkaline and treated in the same way as before, with the solvents named. Chloroform was the only one that dissolved anything. The residue, dissolved in alcohol and allowed to evaporate slowly, deposited crystals, which were

washed of adhering coloring matter with ether in which they were almost insoluble.

To obtain more of the crystals, a quantity of the drug was extracted with alcohol, the solution evaporated, and the crystalline principle separated from the wax and resin by acidulated water, and agitation with chloroform as before, and purified by repeated solution in hot alcohol and precipitation by ether. The crystals were soluble in water, alcohol and chloroform; gave no reaction when treated with Mayer's reagent and other alkaloidal precipitants, excepting the tri-iodide of potassium. They melt at $194^{\circ}\text{C}.$; have a bitter taste, and are colored green with H_2SO_4 and $\text{K}_2\text{Cr}_2\text{O}_7$. In testing for glucosides the results were negative. When heated with caustic soda a decided reaction for ammonia was obtained, thus showing the presence of nitrogen. The crystals responded to the tests for ricinin, so named by Prof. Tuson, who found it in the seed and considered it an alkaloid (*AMERICAN JOURNAL OF PHARMACY*, 1864, p. 423); it was also found in the leaves by Prof. E. S. Wayne, who states that it has no claims to be called an alkaloid. (*AMERICAN JOURNAL OF PHARMACY*, 1874, p. 97).

With a view of determining its ultimate composition, three combustions were made for the estimation of the carbon and hydrogen, and two with soda-lime for nitrogen, estimating oxygen by difference. The results would indicate ricinine to be an alkaloid, having the formula $\text{C}_{24}\text{H}_{32}\text{N}_7\text{O}_3$:

RICININE.	FOUND.		CALCULATED $\text{C}_{24}\text{H}_{32}\text{N}_7\text{O}_3$.
	FIRST.	SECOND.	
Carbon	62.00	62.03	61.81
Hydrogen	6.87	7.55	6.87
Nitrogen	21.00	21.00	21.02
Oxygen	10.13	9.42	10.30
	100.	100.	100.

Distilled water extracted from the powder 18.479 per cent., which, on ignition, left an ash amounting to 5.78 per cent. A portion mixed with two volumes of alcohol and allowed to stand twenty-four hours, precipitated mucilage and albumin amounting to 4.915 per cent. The filtrate evaporated to a syrup and mixed with four

volumes of alcohol precipitated dextrin and other carbohydrates 5.10 per cent., estimated by boiling with dilute acid, and treating with Fehling's solution. Glucose and saccharose were determined in the filtrate by dividing in two portions, the one treated directly with Fehling's solution, and the other after inversion by diluted acid, and ignition of the cuprous oxide obtained. The glucose found amounted to 1.99 per cent. and the saccharose 0.39 per cent., by difference.

The residual powder insoluble in water was treated with a 0.2 per cent. solution of caustic soda. On evaporating and drying a part of the extract the residue was found to be 2.47 per cent. which, on ignition, left 1.27 per cent. of inorganic matter. After acidifying a portion and adding 3 volumes of alcohol, the albuminous matter precipitated, amounting to 0.95 per cent.

The residue washed free from alkali, was treated with a 1 per cent. solution of HCl, which extracted 3.55 per cent., which on incineration left 1.36 per cent.; showing by difference organic compounds amounting to 2.193 per cent.

The residue, washed and dried, amounted to 49.03 per cent. The ash was determined in a few grams of the residue, amounting to 0.87 per cent. After treatment with chlorine the cellulose was washed, dried and weighed; the loss by chlorine was 5.44 per cent., leaving 43.59 per cent. of cellulose.

Stem.—The stem reduced to powder, on drying at 120° C. indicated moisture 6.1 per cent., and the same portion ignited, ash 5.46 per cent. The petroleum spirit extract was 0.275 per cent., consisting of wax with a little resin, the same as found in the leaves. Ether extracted 0.316 per cent. resin identical with that found in the leaves. Alcohol dissolved 0.83 per cent., which crystallized on spontaneous evaporation, and proved to be ricinine with a little coloring matter.

Root.—The root dried, then ignited, showed moisture 7.08 per cent., and ash 7.05 per cent. Petroleum spirit extracted 0.38 per cent. of wax similar to that found in the stem and leaves, except that the melting point is 40° C., and that it is less soluble in alcohol. Ether dissolved 0.338 per cent. of resinous and coloring matter. Alcohol separated 0.416 per cent., the extract containing crystals of ricinine, thus showing that this principle, as well as the wax, exists in all parts of the plant.

The further examination of the root and stem, more than the results given, could not be completed for want of time.

RECAPITULATION OF PROXIMATE ANALYSIS.

	LEAVES.	STEM.	ROOT.
Extracted by petroleum spirit.....	4.582	0.275	0.380
“ “ ether.....	2.575	0.316	0.338
“ “ alcohol.....	2.490	0.833	
“ “ water.....	12.699		
“ “ diluted NaOH.....	1.200		
“ “ “ HCl.....	2.193		
Loss by chlorine.....	5.440		
Residues, cellulose, etc.....	43.590		
Ash.....	11.220	5.466	7.050
Moisture.....	12.700	6.100	7.083
Loss.....	1.311		
	100		

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the AMERICAN JOURNAL OF PHARMACY.

PREPARATION OF A DEXTRIN TO REPLACE GUM ARABIC.—The registry of the following process, by Schuhmann, was announced on November 3d, 1887: The milk of starch is treated with one one-hundredth part of its weight in starch, of hydrochloric, nitric or sulphuric acid. In twenty-four hours the mixture is washed until the waters give no acid reaction. The starch paste thus prepared is diluted to a thick pap, and heated in a digester to 160°–170°C.; or it may be treated in a closed vessel under ordinary pressure, with a current of super-heated air or vapor, until the product ceases to color with iodine. The soluble product thus obtained is diluted to 20°–25° Beaumé, and—a little albumin being added—is heated to the boiling point and passed into a Taylor apparatus, or into a press-filter, in which it is clarified and made colorless with bone-black. Thus purified it is evaporated to a proper consistence, or may be reduced to dryness. A small quantity of vegetable gum may be added with advantage. The mass obtained by this process is entirely soluble in warm or cold water; it is odorless and tasteless, and greatly resembles gum arabic, both in its aspect and its properties; and it may replace gum arabic in most of its uses.—*Moniteur Scientifique*, p. 41, January, 1888.

PEPTONE AND SYNTONIN BY CHEMICAL REACTION.—According to Mr. A. Clermont (*Comptes rend.; Arch. de Phar.*, January 5, 1888), peptones may be made to have a nutritive as well as a digestive value. To make simply nutritive peptones he mixes 20 gm. of hashed meat with 30 gm. of water, and 50 cgm. of sulphuric acid in a glass tube, which he seals and heats in an oil-bath at 180° C. After cooling the tube is opened, and the gaseous products go off, leaving a light-brown liquid, which being filtered and dried (when it gives off ammoniacal vapors), is dissolved easily in water, and again filtered. The solution thus obtained is not precipitated by boiling, or by hydrochloric, nitric or acetic acids; a sufficient quantity of alcohol throws it down, however, as also tannin, bichloride of mercury and chloride of platinum. The product was 4 gm. of peptone for 20 gm. of fresh meat. Repeating the experiment without sulphuric acid, syntonin was obtained; the solution filters slowly, and gives an abundant precipitate with nitric acid. In slightly acidulated water, syntonin easily passes—under the influence of pepsin—into a peptone. Clermont thinks that syntonin would be of great value in cases of slow digestion.

"SELS DE MORUE."—M. Langlebert, a Parsian pharmacist, has been making researches upon the probable therapeutic value of baths composed of salt, which has been previously used in fishing-vessels for the temporary preservation of cod-fish. He finds in this salt (by analysis), a considerable amount of azotized material in the forms of methylamine, dimethylamine and trimethylamine, substances which have, according to the author, been used successfully in affections such as chlorosis, anæmia, scrofulosis, rachitis, infantile paralysis, osseous affections, rheumatism, etc. He concludes, therefore, that the presence of these substances in cod-fish salt, united to the therapeutic-value of the salt itself, offers a compound worthy of the consideration of therapeutists.—*Jour. de Phar. et de Chim.*, January 1, 1888.

ACTION OF ACIDS AND ACID SALTS UPON SYR. AURANT. AMAR.—Leprince, a Bourges pharmacist, points out that however carefully the syrup may be made, it always contains a certain amount of mucilage which is liable to cause the solidification of a preparation with many commonly prescribed medicaments, especially the phosphates. He recommends that the syrup be made wholly from the alcoholic extract. It will then, though retaining all of its taste and aroma, re-

main wholly unaffected by the action of acids.—*Monde Pharm.*, December 20, 1887.

SACCHARIN.—P. Vigier has announced to the French Society of Pharmacy his use of saccharin to advantage in an *elixir dentrifice* made up with a large quantity of oil of mint. He also uses saccharin to sweeten pastilles of chlorate of potassium.—*Arch. de Phar.*, January 5, 1888.

PRESERVATION OF SALICYLATE OF SODIUM.—This salt, whether crystallized or in powder, loses its acid reaction and makes brown solutions after being exposed to the light for a month or six weeks; it may also become musty, and in paper it turns grayish and becomes inert. So it should be kept from moisture and the light. It should also be said that its preservation in liquid form is much affected by the quality of the water used in making the solution; it may turn brown in a few hours in ordinary water, though in distilled water no change is observable.—*Pharm. Cent.; Jour. de Phar. et de Chim.*, January 1, 1888.

CRYSTALLIZED ACONITINE AND DIGITALIN.—The toxic power of these chemicals is so great that several members of the Paris Society of Pharmacy propose that the maximum dose of the former—in granules—should be limited to $\frac{1}{4}$, and of the digitalin to $\frac{1}{10}$ mgm. Bourgoïn cited a case in which $\frac{1}{4}$ mgm. caused dangerous symptoms; and another in which $\frac{1}{2}$ mgm. caused the death of the patient.—*Soc. de Phar.*, Paris, December 7, 1887.

AMORPHOUS AND CRYSTALLIZED STROPHANTHIN.—At the *Société de Thérap.*, November 23, 1887, M. Catillon showed samples of this substance which he said was "soluble in 3 times its weight of warm absolute alcohol, and in 30 times its weight of water; $\frac{1}{2}$ mgm. in hypodermic injection, killed rabbits weighing 750 gm." M. Dujardin-Beaumetz has used strophanthus in three cardiac cases; he gave daily 10 drops of a 50 per cent. tincture of the seeds, and increased the dose by two drops per diem to 15 or 16 drops a day. He uses also a tincture, of which 5 drops represent a mgm. of the extract. He said that strophanthus had a slower but longer continued action upon the heart than digitalis; it is much more suitable in cases where the heart enters into the "tired condition," than when systolism is definitely declared. Diuresis by strophanthus is less abundant, but longer continued than that from digitalis. Catillon stated that $\frac{1}{10}$ mgm. of strophanthin is equal to 1 mgm. of the extract, or 5 drops of the tinc-

ture of strophanthus. M. Blondel stated that fraud was already used in selling strophanthus, as among the seeds he found some whose strength had been already extracted with alcohol.—*Le Prog. Méd.*, December 17, 1887.

ASSAY OF COLCHICUM SEED.—To determine the amount of colchicine, Mr. A. Kremel exhausts with alcohol, in a displacement apparatus, 20 gm. of the unbruised seeds. After boiling for two hours, the alcoholic liquor is poured into an evaporating dish, with the alcohol used in washing the receiver, and 25 ccm. of water. The residuum after evaporation—10 to 15 ccm.—is filtered and exhausted with chloroform, which takes up the colchicine. It is again dissolved in chloroform, which is finally evaporated in a water-bath. The chloroformic extract is treated with water to disassociate the combination $C^{22}H^{25}NO^6 + 2CHCl^3$ which has formed; and is then evaporated to dryness.—*Jour. de Phar. et de Chim.*, January 1, 1888.

STACHYS BULBIFERA.—The *Arch. de Phar.*, December 5, 1887, describes this "new vegetable" of Japanese origin, which Mr. Paillieux has been cultivating on his little farm near Paris. It is a tuber formed of successive nodes, and is from 3 to 5 centimetres in length; the tubers are the rhizomes produced by the plant, which attains to a height of 25 to 40 centimetres. It grows very rapidly and requires little care; its rhizome has the color and consistence of salsify, and its taste resembles that of the artichoke. It may be stewed or fried, and can be eaten with vinegar, like a salad. It may become popular. The editor of the *Jour. de Phar.* refers to it as "this precious vegetable."

THE CHEMISTRY OF SLEEP as shown in the difference between the respiratory combustion of natural slumber and that which is produced artificially, was considered in a paper presented by M. de Saint-Martin. He observed that independently of the fasting condition, natural sleep lowered by 50 per cent. the amount of carbonic acid exhaled, and by 10 per cent. the amount of oxygen absorbed. During sleep induced by morphine the proportion of carbonic acid exhaled fell to a half, and during that produced by chloral or chloroform to a third of the quantity exhaled during the same time in natural sleep. During chloroformic anæsthesia—sufficiently prolonged—the blood became impoverished in oxygen, and was charged with an increased amount of carbonic acid.—*Le Prog. Méd.*, December 17, 1887.

GLEANINGS FROM THE GERMAN JOURNALS.

BY JOHN A. MARTIN, PH.G.

Phthalate of morphine.—E. Bombelon recommends phthalate of morphine as the morphine salt that best fulfils the requirements of the physician. It is more soluble in water than the morphine salts of the mineral acids, and the solutions keep for a long time, even when very dilute. One part is soluble in five parts of water. The solutions are perfectly neutral, and do not produce pain when used for hypodermic injections.

To obtain a pure salt an absolutely pure phthalic acid must be used as there is no mother-water, and the compound does not crystallize, but is obtained as an air-dry varnish, or in the form of beautiful transparent scales.

Hydrochlorate of morphine is precipitated with ammonia, washed and pressed, the alkaloid morphine dissolved in acetic acid, and again precipitated with ammonia, washed and pressed; the purified morphine thus obtained is added in small quantities at a time, to a hot solution of phthalic acid as long as it is dissolved, taking care to add a slight excess of morphine. When the solution has cooled, filter and evaporate with the aid of a gentle heat to the consistence of syrup; pour upon heated glass plates to dry and scale.—*Phar. Zeitung*, 1887, p. 488.

Solution of indigo for writing ink.—Inks are often entirely spoiled by adding a solution of indigo in sulphuric acid. An indigo solution prepared as follows, can be mixed with any ink without injuring it: powdered indigo, 4 parts; sulphuric acid (Nordhausen), 16 parts; macerate for 48 hours with occasional shaking, and add: powdered iron, 7 parts; pyroligneous acid, 5 parts; distilled water, 160 parts.

Cinchona hair tonic.—Oil of rosemary, oil of lemon, each 1 part; tannin, tincture of cantharides, each 2 parts; balsam of Peru, 5 parts; glycerin, rose water, each, 20 parts; tincture of cinchona, and cologne water, of each 120 parts.

Superior cologne.—Oil of ylang-ylang, 1 part; oil of mignonette, oil of jasmin, and oil of lemon, of each, 2 parts; cherry-laurel water, and tincture of vanilla, each, 3 parts; triple orange-flower water, 100 parts; alcohol, 1000 parts. The mixture should be warmed by placing the container in hot water; then let it stand in a cool place for a few days and filter. Warming the mixture partly replaces distillation.—M. Fischer in *Pharm. Ztschr. f. Russland*, 1887, p. 468.

Emulsion of lanolin.—As this emulsion is not easy to prepare Hoeffle's method, given in *Ztschr. d. Öst. Ap. Ver.*, is worthy of notice: Lanolin is heated to completely expel the water it contains; it is then weighed and rubbed up with half its weight of powdered gum arabic, the quantity of water required for oil emulsions added, and the emulsion prepared in the usual manner.—*Pharm. Ztschr. f. Russland*, 1887, p. 510.

Antiseptic petrolatum.—Brondel, in *Med. Zig.*, recommends for use on the hands of accoucheurs a mixture composed of corrosive sublimate and oil of eucalyptus, each, 10 parts; soft paraffin, 100 parts.—*Rundschau, Prag*, 1887, p. 752.

Binoxide of hydrogen as a styptic.—According to Neudorfer, *Med. Zeitung*, 1887, 15, a single drop pressed upon the wound for one minute is sufficient to stop the bleeding.—*Archiv der Pharmacie*, 1887, p. 588.

Canadol is recommended as a reliable and economical anæsthetic to take the place of ether and cocaine. It is a colorless, very volatile and inflammable liquid, obtained as a by-product in the distillation of American petroleum; in odor resembles benzin, and is not miscible with water or alcohol in any proportion. During its use the skin becomes very hard and completely insensible. Operations are easily conducted, and in cases of bleeding the blood may be chilled at once.—*Rundschau, Prag*, 1887, p. 729. (See AMERICAN JOURNAL OF PHARMACY, 1887, p. 490).

To prevent bumping in retorts during distillation.—Reissmann, in *Ph. Centralh.* recommends the use of a tightly wound spiral of platinum wire, loosely filled with long pieces of pumice-stone, the ends of the spiral so turned in that the pieces of pumice-stone can freely move about without falling out. The weight of the spiral must be heavy enough to sink in the liquid. For very large retorts several of these spirals must be used.—*Rundschau, Prag*, 1887, p. 818.

Improved insect powder.—A mixture of 1 part naphthalin, and 100 parts powdered pyrethrum roseum is more effectual than the pyrethrum flowers alone. The naphthalin must be in very fine powder.—*Med. Chir. Centralblatt; Phar. Ztschr. f. Russland*, 1887, p. 558.

THE DRUG BUSINESS IN AUSTRALIA, INDIA AND
THE UNITED STATES.¹

Read before the Alumni Association, Philadelphia College of Pharmacy.

In a comparison of the pharmacy of America (U. S.), Australia and India, we have three countries widely separated and each dependent on its situation and customs in the development of its drug trade, and uninfluenced by any other country, with the exception probably of Australia, which naturally patterns after England, her people being thoroughly English as far as the profession of chemistry is concerned, though outside of this, they more nearly resemble Americans in their business enterprise. America by her early independence and hostility to England, her admixture of pharmacists from all countries, is distinctly responsible for the progress made in the profession in this country, the best evidence of which is in the revised edition of the British Pharmacopœia which inclines to that of the United States in formulas as well as classification. India necessarily uses the British Pharmacopœia, her druggists being of that nationality as well as ninety-nine onehundreths of her white population. But the condition under which business is done in India, the customs of the country and the climate, necessitate a different state of affairs in many cases.

The most important item is, of course, proficiency, and which of the three countries can claim the palm? The United States has Colleges of Pharmacy in several cities, and her Examining Boards in some States to regulate the trade and restrict it to competent persons; and Australia is likewise provided, while many of her druggists serve their time and obtain their certificate in England. In India a majority of the druggists are members of the British Pharmaceutical Society, and it is not to be gainsaid that the examination is very rigid, and many rejections are made both in the minor and major years. But India has no pharmaceutical laws and allows anyone to engage in the drug business; hence there are many incompetent persons so engaged, who depend wholly on their clerks in the conduct of their business. We have such here, but the number is small, fortunately, and legislation will shortly prevent it entirely.

The apprentice in the United States, serves on an average three years, while the Australian is required to pay a premium and serve five years. There is no apprenticeship in India worth speaking of, owing to the conditions which govern a society. Does a five years apprenticeship turn out a better man than that of three years? I think not, except in one case, and that is the slow-plodding fellow who is slow to learn, means to learn, and once he has mastered a subject retains it. But the average apprentice is as competent at the end of three years to do the practical work of a drug store as the five-year lad, and at the end of his fourth year is infinitely superior to the latter, owing to the greater scope of work he attends to, while the apprentice still lingers at defined limits. The Australian certainly has no advantage in his longer apprenticeship. After the apprenticeship or during its latter years, the theoretical branch of pharmacy impresses itself on the student and owing to our superior advantages in collegiate education and more stringent registry laws, the home druggist excels his Australian cousin on the average. There has been but one pharmaceutical school in Australia for many years and the attendance but slight,

¹ See also AMERICAN JOURNAL OF PHARMACY, 1887, p. 103.

while the qualification examination has been merely nominal, except in Victoria where they were more strict. The Colonial Boards have now united and a General Board for Australia has been organized, looking to a more rigid regulation of pharmacy. But *practice* is what counts in pharmacy, and undoubtedly we are a nation of practical people. In our drug stores the clerk who is neat in his work, alert in his attention to customers, suave in his dealings, with them, and quick and accurate in his work, is the most appreciated. The nature of our trade forces these ideas on him, and he is very dull who does not see that these attributes are the essence of three-fourths of his future success in his profession. On the other hand the Australian is more slow-going, given to "taking his time," and has not that freedom of conversation with customers incident to Americans. The English idea of "master and man" is very prevalent in Australia, few of the employers vouchsafing a friendly or social word to their clerks, but maintaining an air of "upper crust," which seems to suppress one somewhat. He lacks the tact and address of his cousin, and does not learn that expertness and celerity in manipulation incident to the American, as his employer insists on his customer giving time, which is generally double that really necessary. In India the average druggist is good, but the Australian is better, and from my experience and connection with employers and clerks, the American is the best "all 'round" druggist of the three; and an American clerk who has faith in his own qualifications, can take a position in any of the two countries and feel that although "a stranger in a strange land," he is there "to stay."

There is but little room for comparison in the appearance and arrangement of the stores, for we are far ahead in making our places of business attractive. Australia and India stick to the old gold paper label, but few stores have improved on their shelf bottle, and the antediluvian carboy still occupies half the show window. Paper labels on the drawers, ancient designed show cases, and a general air of "don't come in unless you want physic," give them anything but an attractive appearance. I speak of the average store, for there are some that are superior to these, but very few. The stock differs in some respects. We often carry lines of goods not belonging to a legitimate drug business, and our sundries goods branch is greatly enlarged. The Australian does a more legitimate drug business, his sundries being confined mostly to toilet requisites, etc. In India the drug store is generally a department of a general merchant's establishment, consequently wholly pharmaceutical, the druggist attending only to this department. The handsome soda fountains customary in our stores find no place in Australian establishments, nor in India, but in the latter place the business of bottling aerated waters is connected with and a part of the drug business. Did the climate permit people to walk the streets of Indian cities during the summer as we do here, the fountains would hold high carnival there, but only those venture about in the sun who are compelled to do so; hence there are but few white people about during the hours when the fountain is expected to appeal to their patronage. One might say, "But there is a large evening trade for soda-water by pedestrians." Granted; but in India the stores all stand back from the streets in lots, and the pedestrians at night are few in number, the stores being closed at dusk, one clerk remaining about the premises in case of a call. The usual apartment for patents is customary to all and the trade is similar in each country, except that there are more American patents on the Australian and Indian shelves,

than vice versa. The cigar case usually found at the entrance of our drug stores is also absent in the other countries, the Australian druggist not selling the weed, and the Indian druggist selling them by the box only. There is small reason to do otherwise in India, when cigars sell at thirty-five cents to \$1.00 a hundred.

There is considerable difference in prescription work, India and Australia being somewhat similar. Blanks are not furnished physicians as in this country, the doctor providing these himself, and they are as a rule about three times the size of our ordinary blank, and why they should be so I have never been able to determine. If it were the custom as with us, to retain the original prescription, the file would present a very ragged sight, so many sizes of paper being used; but in Australia and India, the prescription belongs to the patient and must be returned. This entails much more work in dispensing than with us, but the facility in referring to old prescriptions is far preferable than raking through a dusty file. A good plan when time will admit, is to daily copy the prescriptions and renew entirely from the book. The form of label is similar to ours, except that in all cases the physician adopts the very commendable practice of writing the name of the patient. This name is put on the label and the doctor's name omitted. It is a most important item in dispensing and it would be a great improvement if our M.D.'s would practice it. In Australia, Latin directions are the rule, while in India they are in English, certainly the proper way, and it seems absurd that a system that allows the patient to retain the prescription, should not also adopt English directions, which would be a guide and check on the dispenser. Mixtures are of larger quantities than ours, the average being six and eight ounces, but the doses are in proportion, and a favorite practice is to direct the doses in parts, for instance, one-sixth part, one-fourth or one-eighth part, every two hours, etc. This necessitates a graduated paper being pasted on the bottle. I prefer our own method. Empty capsules are not used, but capsuled pills as prepared in America are used to a great extent. Many coat their pills with French chalk, but they are not desirable.

The Australians and Indians have much to learn yet in coating pills for the market, their best being very inferior to ours. Few spread plasters are used, another point wherein they are in the rear. The manner of printing "The Mixture," "The Liniment," etc., on prescription labels, is customary in all stores in the two countries mentioned, and I believe it is a step backward for us to be giving up the idea, for such seems to be the case. The old labels were not suitable to the advance in the designing of the present labels, but a very pretty label, with the names as above, can be printed, which looks very neat on a bottle, and may often prevent mistakes. It may surprise some when I say that in prescription work the most complete I have seen done, is that in the drug stores of India. Bottles of all descriptions are kept in stock, flint and blue glass, from the smallest up to quarts. Blue bottles are always used for external remedies, and the corks capped with red sealing wax; mixtures, etc., with black wax. All labels are "The Mixture," "The Ointment," etc.; then there are the slips—"Caution," "Poison," etc., and each bottle is capped with a Hunt's bottle cap; "Poison" caps for that sort. A bottle is never refilled when brought in for that purpose, but a clean bottle always used, no matter whether for mixture or liniment. The slightest soil on a pill box or powder box label

is reason for a new box. Distilled water is always used unless specified otherwise, and many druggists make a practice of silver-coating all pills prescribed, unless otherwise ordered. Every bottle of drugs sold is capped, and no parcel is sent out unless wrapped in a second paper enclosing the label. Prices seem to rule the same in the three countries. The penmanship of prescriptions cause the same trouble the world over; some good, some bad, and some that Webster has no words to describe. But for pure "cussedness" and unintelligible scrawl the "cake" must be awarded to a physician I met in Tasmania. This man was a member of the English College of Surgeons, a well-educated man and a fine physician, but with a handwriting that gave one neuralgia to look at. He never used any blanks, but always selected the dirtiest piece of paper he could find, and never wrote on two pieces of the same shape, but, from the looks of the prescriptions, took peculiar delight in making as many shapes as possible. He started off with something that was meant for a name, but looked as if his pen had run riot. He then spread himself over the paper, brought his directions up in a line to see how the "riot" was getting along, and then lost them in a new prescription he was writing from another corner. Half a dozen prescriptions on the same paper, and no two written in the same direction. This would have made little difference had they been legible, but one had to do some tall guessing to read them. We always had a "picnic" at the store about once in three months. He took quarterly trips to the tin mines, and while there prescribed for patients who came to him. He took a big sheet of white paper, and on this sheet went the prescriptions, each one written as the paper happened to be lying when the patient came in. Each had a name, but all looked the same; each had directions, but it was seldom with the prescription. When he had a sheet filled he would post it down with instructions to dispense and send to the parties mentioned. The whole force of the establishment then went to work and solved the puzzle as best we could.

There is a better cash business conducted in this country than in Australia. Credit business in Australia is very general, and the majority of accounts run yearly. In India nine-tenths of the business is credit, but accounts are collected monthly. There is a great loss, though, and as the statute of limitations is only three years there are many opportunities for swindling one out of a bill. Salaries of clerks are better here than in Australia. A first-class clerk in Australia can seldom get over \$18.00 a week, while the majority are paid about \$10 to \$12.00. In India salaries increase with time of service, and a good man can, at the end of five or six years, be drawing \$200.00 a month and over. The hours of business in Australia are similar to ours, while in India they are, during the day, only with one in calling distance after dark.

I have endeavored to point out, as far as possible, the points of difference between the respective countries mentioned, and summing up my reflections on the subject, I cannot but think that we have surpassed the two countries in all that pertains to Pharmacy and that we are now able to hold our own with any of the countries of Europe. May the good work go on, and may we come to that state when to be a druggist means that every such man has won his way to that position by an apprenticeship, a College Diploma, and a moral character that gives him a high position in the community in which he resides

JOHN A. FALCK.

LOS ANGELES, Cal., December 26th, 1887.

VARIETIES.

Physiological action of oil of turpentine.—Dr. Hare gives the following summary of his observations:

1. Oil of turpentine in small doses, resembling those ordinarily given in practical medicine, produces an increase in the number of the cardiac beats due to a direct stimulant action on the heart.

2. In larger doses it produces distinct slowing of the pulse, due to a stimulation of the pneumogastric or inhibitory centre.

3. Its influence on the vaso-motor system, if at all, is very slight, either with large or small doses.

4. Poisonous doses (5 c.c. to 10 c.c.) (m. 80 to 160) produce death by cardiac failure when injected directly into the jugular vein.

5. The drug in small doses increases reflex action somewhat, but in large doses decreases it, the increase being due to a stimulation of the spinal cord, and the decrease due to depression of the sensory side of the cord and afferent nerves.—*Medical News*, November 19, 1887.

Effects of salicylic acid on the health.—The question whether the continuous use of salicylic acid is injurious was attacked by Kolbe, who took for nine months at least fifteen grains of salicylic acid daily in his drink without the least symptom of injury. Dr. Lehmann (*Arch. f. Hygiene*, V.) has further experimented on two Munich laborers, one of whom, aged forty-nine, for ninety-one days, excepting Sundays and holidays, i. e. for seventy-five days, took altogether in his beer five hundred and seventy-eight grains. The other, aged thirty-seven, consumed in the same time over seven hundred grains. Neither of these suffered in the least. Now this amount is immensely in excess of what could possibly have been put in the exported beer alleged to have contained salicylic acid. It should be further said that the best brewers repudiate both the allegation of using salicylic acid and the necessity of using it.—*Med. Chronicle*, October 6, 1887.

Pyridine in asthma.—In the course of former experiments Renzi observed that, besides lessening the number of respirations, pyridine also increased the energy of the heart's systole. He therefore tested it in severe cases of heart disease. He first gave the pyridine in doses of from six to ten drops, diluted with two or three drachms of water, and gradually increased the dose to twenty-five drops. In the cases of nephritis and mitral stenosis there was no improvement, but in the others there was a strengthening of the systolic impulse, and the number of beats was lessened. The blood-pressure was increased. A systolic action was allayed more readily by pyridine than by digitalis, and it has no cumulative effects. Angina pectoris, that often complicates such cases, was more benefited by pyridine than by anything else.—*Centralbl. f. klin. Med.; Jour. A.m. Med. Assoc.*, Dec. 10, 1887.

Ether as a parasiticide.—The killing of pediculi pubis by one single application of ether, has first been suggested by Dr. G. P. Thomas, of Alameda, in California. Ether recommends itself in preference to chloroform, which has been employed for the same purpose, as causing less pain and irritation to the skin of this very tender region.—*London Medical Record*.

Coca extract in painful affections of the stomach.—In the last two years and a half D'Ardenne has treated many cases of painful affections of the stomach with coca extract, for the purpose of relieving the pain. In the cases associated with

structural lesions of the stomach-walls the relief was of short duration and incomplete, but in the purely functional cases the pain was always caused to disappear, however severe the attack, and though the usual remedies had been employed in vain. The dose used was two grains of the extract, every two hours.—*Rev. Gen. de Clin. et de Ther.; Jour. Amer. Med. Assoc'n*, Dec. 10, 1887.

MINUTES OF THE PHARMACEUTICAL MEETING.

The meeting was called to order and Mr. Wm. B. Thompson was asked to preside.

The minutes of the last meeting having been read, Mr. McIntyre alluded to the fact that no mention was made of a statement regarding the poor quality of *sugar* supplied to the trade; the registrar stated that the matter had been frequently up before the meeting and the grades of sugar which were unobjectionable had been repeatedly mentioned. Mr. Robbins said that the statement about the possibility of exhausting *buchu* was directly different to what he intended to say; that while three-fourths of the percolate would contain the activity of the *buchu* it would require quite double that quantity of liquid to moisten and expel the liquid percolate to exhaustion.

Mr. Lemberger, of Lebanon, made a few remarks about the growth of the College and the wide-spread influence its graduates had upon the pharmacy of our country.

The registrar presented to the library from Dr. Ruschenberger, U. S. N., a copy of the History of the College of Physicians, for the first hundred years of its existence, for which the meeting returned the thanks of the College.

A sample of *cold-pressed linseed oil* was received from Dr. A. W. Miller. Another sample made by Aschenbach & Miller from seed ground out West showed the presence of copper; but the sample presented which was made from seed ground by the firm, has none of the appearances indicating copper.

The query propounded was whether *cold-pressed linseed oil* was in any wise different from the commercial oil. Mr. Moerk said that much of the commercial oil was purified by treatment with acids, and if it has been so treated it is not amenable to the same tests as an oil obtained by percolating pure meal with a solvent and evaporating the latter; the test of its solubility in an equal volume of absolute alcohol is a reliable test, and the test with 95 per cent. alcohol is also an interesting one. Mr. Procter moved, as Mr. Moerk had so thoroughly examined the subject, that the committee be discharged from further consideration of the matter; this was seconded and the motion was carried.

Mr. Franz, a member of the senior class, read a paper upon *Eupatorium perfoliatum*. A paper upon *mercurammonium chlorides* was read by Mr. F. X. Moerk. The paper was listened to with close attention and elicited remarks from several present. Prof. Remington referred to the compound which had been described as thrown down in a granular powder, and said that it was very important that the article should be entirely free from grit and should easily mix into a smooth ointment as it is employed frequently in granular eyelids.

Mr. J. H. Bunting read a paper detailing experiments made in the pharmaceutical laboratory under the direction of Prof. Remington, upon the most suitable menstruum for a *fluid extract of blue cohosh*.

A paper upon *syrup and fluid extract of lactucarium* by Mr. Geo. M. Beringer was read by the registrar. Mr. Webb inquired whether benzin did not remove some of the valuable principles of the lactucarium; Mr. Lemberger said that he thought it did not and that he had been repeatedly assured that the remedy was a valuable one. Mr. Webb said that some years ago Mr. Hubbell sold a syrup of lactucarium which was as handsome almost as Aubergier's, but that it was dosed with morphine to give it efficiency. The question as to what kind of lactucarium was to be preferred, most of those present expressed a preference for the English article. Mr. England had used Allen's in preference to any other and gave a formula for the syrup published in the December number of the Journal for 1886.

Professor Remington said that he noted the recommendation in reference to *fluid extracts* of fifty per cent. strength; that it would be an act of retrogression; that the late Professor Procter was the author of the class of extracts as they are now prepared, and that to introduce fluid extracts of half strength would be an admission of the inability of the pharmacist to make as good an article as our present formulæ directed; that fluid extracts represented progress, the outcome of the studies on percolation by Dr. Squibb and other eminent operators in pharmacy.

Mr. McIntyre said he thought Prof. Remington's remarks did not cover the whole ground, the difficulty is for the apothecary to obtain pure drugs; that the wholesale manufacturer had the first chance and did not have to rely upon ground drugs, and that as some physicians are now furnishing the medicines to their patients we have no chance to improve the fluid extract or syrup of lactucarium.

Mr. England read a paper upon *emulsion of terebene*, and Mr. F. B. Quackenbush, a member of the junior class, read a paper upon *fluid extract of yerba santa*, giving the results of experiments made in the pharmaceutical laboratory of the College. All the papers read were referred to the Publication Committee. After a short discussion a motion to adjourn was made and carried.

T. S. WIEGAND,
Registrar.

EDITORIAL DEPARTMENT.

Death of Professor Asa Gray.—This eminent botanist died at Cambridge, Mass., January 30th, in the seventy-eighth year of his age. A biographical sketch will appear in our next number.

Joseph Roberts, President of the American College of Pharmacy, and during 1885-86, President of the American Pharmaceutical Association, died January 31st, after an illness of one week, from pneumonia; aged sixty-three years.

The Texas and Southwestern Druggist, published at Waco, Texas, will be unable to issue its February number, owing to the destruction by fire of the printing office during the latter part of January. We trust that our contemporary will soon be enabled to resume publication.

Crowded out.—A number of books and pamphlets have accumulated upon our table during the past two months, editorial notices of the same in the pages of the Journal having been delayed through other matters claiming space; but we hope to make room for these reviews in the March number.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Year-Book of Pharmacy, comprising abstracts of papers relating to Pharmacy, Materia Medica and Chemistry, contributed to British and foreign journals, from July 1, 1886, to June 30, 1887; with the Transactions of the British Pharmaceutical Conference at the twenty-fourth annual meeting, held at Manchester, August, 1887. London: J. & A. Churchill, 1887. 8vo, pp. 631.

Proceedings of the American Pharmaceutical Association at the thirty-fifth annual meeting held at Cincinnati, O., September, 1887; also the Constitution, By-Laws and Roll of Members. Philadelphia: Published by the American Pharmaceutical Association, 1887. 8vo, pp. XX and 729.

These two annual publications have both been issued in January. They contain the full minutes of the annual meeting of the Association publishing the book, including the papers read, reports of officers and committees, etc. Among the latter is the "unofficial formulary" accepted by the Conference, and comprising formulas for thirty-seven pharmaceutical preparations not contained in the British Pharmacopœia. The formulary prepared by a Committee of the American Association is by far more extensive as might be expected, considering the large territory, the most urgent wants of which it is intended to supply. It was intended to be printed in the present volume of Proceedings, which, however, would have considerably delayed the distribution of the latter; hence the Council authorized, for the present, the omission of the "Formulary" which will be furnished to the members as soon as completed.

The minutes and papers, a full synopsis of which has been given in the October number of this Journal, occupy in each of the volumes nearly two hundred pages, the number of papers read before the Conference exceeding by five those read at Cincinnati; and respectively, 317 and 371 pages are occupied by the Year-book and the Report on the Progress of Pharmacy, the former being supplemented by a list of books and pamphlets on pharmacy and collateral branches published during the preceding year.

Both volumes, like their predecessors, are of permanent value to the pharmacist and druggist as books of reference to the pharmaceutical literature during the preceding year.

Organic Analysis. A manual of the descriptive and analytical chemistry of certain carbon compounds in common use. For the qualitative and quantitative analysis of organic materials; commercial and pharmaceutical assays; the estimation of impurities under authorized standards; forensic examination of poisons; and elementary organic analysis. By Albert B. Prescott, Ph.D., M.D., Director of the Chemical Laboratory in the University of Michigan, etc. New York: D. Van Nostrand, Publisher, 1887. 8vo, pp. 533.

It appears to us that the aim and character of the work are summarized in the following sentences quoted from the Author's preface: "As a mere changeful body of directions, giving the latest expedients in methods, analy-

tical chemistry cannot claim to have educational value; but as an operative introduction to the character and deportment of compounds, analysis becomes a logical mode of study, fruitful of important results."

Organic analysis rests primarily upon the nature and character of the more important compounds, including their physical and chemical behaviour under the influence of various agents; and the value of analytical methods, both qualitative and quantitative, depends upon the perfection of the processes for the characterization or isolation of the compounds under the most varying conditions. Obviously, as a mode of study, analysis will fulfil its objects best, if character and behaviour of the compounds under consideration be continually kept in view.

The work before us has evidently been written with such objects in view. Not merely one or more processes are given by which a compound may be recognized or distinguished from others; but in each case its chemical constitution, its origin, and its essential physical and chemical characters are given in full, and subsequently the means of identifying the compound are stated, its separation from others, and its quantitative determination, together with the methods for ascertaining its purity, or estimating the amount of impurities present. The literature of each subject is fully given, the original sources being quoted together with the year when first published, and with such other journals or works that are likely to be more accessible than the original publications.

The arrangement is alphabetical; but very similar compounds and the important constituents of a drug or plant are treated together under one common head. Thus butter, castor oil and other fats are mentioned in their alphabetical order, but are considered under "Fats and Oils;" quinine, cinchonine, etc., under "Cinchona Alkaloids;" brucine and strychnine under "Strychnos Alkaloids," etc. In all cases where observations have been made regarding the passage of organic compounds through the animal economy, the results are fully noted and afford a most valuable aid to the investigator in forensic and other researches. The most recent schemes for plant analysis, elementary analysis, the determination of fats, coloring matters, alkaloids and other groups of organic bodies are comprehensively considered under appropriate heads.

The work will prove to be a very valuable one for the laboratory. It is calculated to widen the views of the intelligent student in his endeavors to acquire a substantial knowledge of the carbon compounds; and the experienced analyst will find it a comprehensive and reliable work of reference on most questions which are likely to arise in analytical investigations. Several classes of compounds, like sugars and other carbohydrates, various hydrocarbons and allied bodies, possess considerable commercial and pharmaceutical importance, and would seem to deserve much fuller treatment than could be accorded to them under the head of plant analysis.

The make-up of the book is attractive, the illustrations are instructive, and the arrangement of the matter is convenient for ready reference.

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Vol. 60

AMERICAN

No. 3

JOURNAL OF PHARMACY.

PUBLISHED BY AUTHORITY OF THE

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Under the supervision of the Publishing Committee, consisting of

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Price, \$3.00 per Annum,
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MARCH, 1888.

Vol. XVIII., No. 3

CONTENTS.

Analysis of the Volatile Oil of Monarda Punctata, Linné. By Hermann J. M. Schroeter	113
Analysis of the Leaves of Eupatorium Purpureum. By Frank M. Siggins.	121
Analysis of Poke Root. By Wm. A. Par-tee, Ph.G.	123
Olive Culture in California. By James E. C. Bell.	124
Honey Production in California. By J. E. S. Bell.	126
Purification of Methyl Alcohol. By Jos. Emil Huber, Ph.G.	126
Formic Acid: Its Detection and Estimation in Acetic Acid and Acetates. By Frank X. Moerk, Ph.G.	131

Commercial Tartar Emetic. By Kaspar Hörner, Ph.G.	135
Reduced Iron and Iron Pills. By Henry McDavit, Ph.G.	136
Percolation of Buchu Leaves. By A. L. Beck, Ph.G.	137
Abstracts from the French Journals	138
The Home of the Clethras. By Dr. H. H. Rusby.	142
Varieties	146
Minutes of the Pharmaceutical Meeting	148
Editorial	150
Proceedings of the State Pharmaceutical Associations	152
Reviews and Bibliographical Notices	152
Obituary	155

NOTICE TO READERS.

This journal is devoted to the advancement of PHARMACEUTICAL KNOWLEDGE and to the advocacy of a MORE THOROUGH EDUCATION and PRACTICAL TRAINING for all persons engaged in PREPARING and DISPENSING medicines, drugs and chemicals.

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LARGE NUMBER OF FORMULAS, are contained in it, including many which, though not official, are valuable and in use.

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An ADVERTISING SHEET is appended to each number, in which suitable advertisements will be inserted, a proper discrimination being observed in relation to their character.

Address all papers for publication, etc., to the Editor JOHN M. MAISCH.

All communications relating to subscriptions, advertisements, etc., to the Business Editor, H. H. WOLLE, 143 North Tenth Street, Philadelphia, Pa.

Meetings of State Pharmaceutical Associations.

STATE.	TIME.	PLACE.	LOCAL SECRETARY.
Alabama.....	May 3d.....	Selma.....	G. A. Cunningham,
Delaware.....	May 3d.....	Wilmington.....	
Florida.....	May 8th.....	Tallahassee.....	J. A. Conover, Jacksonville.
Indiana.....	June 5th.....	Fort Wayne.....	J. R. Perry, Indianapolis.
Iowa.....	May 2d.....	Iowa Moines.....	Norman Lichty,
Kansas.....	May 17th.....	Abilene.....	E. E. Lewis,
Kentucky.....	May 9th.....	Henderson.....	F. Y. Johnson, Louisville.
Louisiana.....	April 11th.....	New Orleans.....	Mrs. E. Rndulf.
Massachusetts.....			
Minnesota.....	June 12th.....	Stillwater.....	J. C. Hearing.
Mississippi.....	May 15th.....	Meridian.....	H. F. West, Fayette.
Missouri.....	June 12th.....	Sweet Springs.....	J. D. Eads, Warrensburg.
Nebraska.....	May 8th.....	Lincoln.....	W. C. Lane.
New Jersey.....	May 16th.....	Morris town.....	H. M. Smith.
New York.....	June 19th.....	Catskill.....	G. A. Dykeman
Ohio.....	June 12th.....	Columbus.....	H. C. Cook.
Pennsylvania.....	June 12th.....	Titusville.....	G. W. Lippincott.
Tennessee.....	May 9th.....	Chattanooga.....	
Texas.....	May 8th.....	Austin.....	E. D. Oesch, Fort Worth.
Virginia.....	May 1st.....	Danville.....	F. Clark.
West Virginia.....	June 19th.....	Clarksburg.....	C. Meakemeller, Wheeling.

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Committee on Apprentice Examinations, 145 N. Tenth St.

WM. B. THOMPSON, Sec'y

The Sixth Pharmaceutical Meeting of the series will be held in the Museum of the College of Pharmacy, Tuesday, March 20th, at 3 30 P. M. All interested in pharmacy and allied sciences are invited to attend and bring forward any matters of interest to the profession.

T. S. WIEGAND, Registrar.

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THE AMERICAN JOURNAL OF PHARMACY.

MARCH, 1888.

ANALYSIS OF THE VOLATILE OIL OF MONARDA PUNCTATA, LINNÉ.

A Contribution from the Chemical Laboratory of the Philadelphia College of
Pharmacy.

By HERMANN J. M. SCHROETER.

Read at the Pharmaceutical Meeting, February 21.

Horsemint is a perennial herb, indigenous to the United States, and belonging to the natural order Labiatae; the leaves and tops being used in the preparation of the volatile oil. This volatile oil is described as having a yellowish or brownish-red color, lighter than water, and crystallizing below 5° C. It consists of an elæopten, which has not been examined; and a stearopten, which is thymol $C_{10}H_{14}O$, identical with that obtained from oil of thyme.

Oil of horsemint, as far as could be found, has only been examined by Arppe (1846, Liebig's Annalen, lviii. 41), who separated an elæopten and a stearopten. The results of his experiments with the latter compound showed the following composition:

Calculated for $C_{10}H_{14}O$. Thymol. Arppe (mean).

C—80.00	||	78.88
H—9.33		9.42
O—10.67		11.70

He also gave the composition of the elæopten, which boiled at 224° C., as follows: C—86.41; H—9.85; O—3.74.

The analysis of this oil was conducted in the Chemical Laboratory of the Philadelphia College of Pharmacy, under the direction of Professor Trimble.

Three samples of the oil were used to experiment with.—Sample No I, was a specimen from the Museum of this College, which

was presented some six years ago. It was contained in a ten pint bottle and about one-quarter of its volume was a crystalline deposit of thymol, having formed gradually by age. It was of reddish-yellow color, sp. gr. .926, strong mint-like odor and neutral reaction. Samples Nos. II. and III., were procured from reliable sources, had both a brownish-red color, sp. gr., .920 and .922 respectively, somewhat fragrant and minty odor, and neutral to test paper. These were subjected several times to a temperature of -15° to -20° C. for several hours, but no separation of thymol occurred. The process described in the National Dispensatory was then tried as follows:—The oils were subjected to fractional distillation; portions of the distillates obtained at above 200° C. were treated with solution of soda, the sodium compound separated and treated with HCl, but no thymol was obtained. The higher fractions obtained by fractional distillation from all three samples (225° – 245° C.), were also subjected to a temperature of below -15° C, but all without yielding crystals of thymol. It was concluded that samples Nos. II and III had either previously been treated for thymol and separated, or else being freshly distilled oils, had not become sufficiently changed to allow of the crystallization of that compound. This latter view, from further investigations, is probably the correct one.

Sample of oil No. I assumed with solution of ferric chloride a bright-red color, changing on long standing to near black. Samples Nos. II and III gave no reaction with this reagent. Solution of bisulphite of sodium gave no reaction with either of the samples of oil, indicating the absence of any aldehyde-like bodies.

Sample of oil No. I, after partial drying with calcium chloride, was subjected to fractional distillation. On redistillation 6 fractions were obtained as follows:

I. 170° – 185° C. III. 200° – 230° . V. 245° – 255° .

II. 185° – 200° . IV. 230° – 245° . VI. 255° +

Fractions V and VI had low boiling points, showing decomposition products. Fractions I and IV were the largest, and therefore were investigated. The former constituted about 25 per cent., and the latter 15 per cent. Fraction I (170° – 185°) was redistilled over zinc dust, the largest portion distilling at 170° – 173° C. This having a quite constant boiling point, several ultimate analyses were made of same. The results, however, showed from 2–4 per cent. still lacking to assume this body a hydrocarbon. The same portion

was now redistilled over metallic sodium; three combustions of this distillate were made with results as follows:

Calculated for $C_{10}H_{16}$.		Found.		
		1.	2.	3.
C	88.23	88.10	88.35	88.28
H	11.77	11.20	11.30	11.45
100.00		99.30	99.65	99.73

The above results would show the presence of a hydrocarbon in the oil, corresponding closely to $C_{10}H_{16}$. This fraction was colorless, sp. gr. .856, and of fragrant odor. The formula of this body was established by taking its vapor density, which will be given below.

Fraction IV (230° – 245°) after redistillation gave a very large portion distilling at 230° – 233° C. This was of slight yellow color, sp. gr. .968, quite viscid, and somewhat minty and camphoraceous odor. This was submitted to ultimate analysis, three combustions giving following results:

Calculated for $C_{10}H_{14}O$.		Found.		
THYMOL.		1.	2.	3.
C	80.00	79.75	79.85	80.05
H	9.33	9.44	9.32	9.35
O	10.67	10.81	10.83	10.60

The above corresponds very close to the formula $C_{10}H_{14}O$, being that of thymol. The formula of this body was also calculated from its vapor density.

Sample of oil No. II was next submitted to fractional distillation, similar to that pursued with sample No. I. The oil began to boil at 150° C., and after repeated distillation the following ten fractions were obtained:

I. 160° to 175° C.—II. 175° to 180° —III. 180° to 185° —IV. 185° to 195° —V. 195° to 210° —VI. 210° to 220° —VII. 220° to 233° —VIII. 230° to 240° —IX. 240° to 250° —X. 250° +

Fractions I, VIII and IX being the largest, constituting about 15 per cent., 25 per cent. and 20 per cent. respectively, were therefore only investigated. The fractions obtained between 180° to 225° C.,

were taken to be mixtures of these larger ones; the distillate coming over regularly and gradually until 230° was reached, when the largest fractions were obtained. The portion distilling above 250° was viscid, of dark-brown color, empyreumatic odor; this being a decomposition product was disregarded.

Fraction I (160° to 175°), after redistillation of several times over metallic sodium, the largest portion distilled at 160° to 163° C. This corresponded to the lightest portion obtained from sample No. I, although the boiling point of the former was a few degrees higher than that of this body. This was colorless, of fragrant odor, sp. gr., .854.

Five combustions of this compound, of which the first three are those after once redistilling over sodium, the other two after another such treatment, gave the following results:

Calculated for $C_{10}H_{16}$.		Found.				
		1.	2.	3.	4.	5.
C	88.23	87.02	87.08	87.20	88.20	88.25
H	11.77	11.40	11.52	11.61	11.55	11.70
	100.00	98.42	98.60	98.81	99.75	99.95

In composition this body agrees with that obtained from sample of oil No. I, and with very close figures to the formula $C_{10}H_{16}$, as noted above.

Fraction VIII (230° to 240°), after redistillation distilled at 230° to 232° C. This corresponded to the same fraction obtained from sample of oil No. I at this temperature. This was almost colorless, becoming yellow on standing, sp. gr. .964, of a mint-like odor. Three combustions of this compound showed it to have the same composition as the former body found in the oil No. I.

Calculated for $C_{10}H_{14}O$.		Found.		
THYMOL.		1.	2.	3.
C	80.00	79.90	80.10	80.05
H	9.33	9.45	9.40	9.35
O	10.67	10.65	10.53	10.60

Fraction IX. (240° – 250°), when redistilled, yielded a very large portion at 240° – 242° C. This was an oily liquid, similar to the foregoing, slight yellow color, specific gravity 9.72, mint-like and em-

pyreumatic odor. Four combustions of this compound gave the following results:

CALCULATED FOR $C_{10}H_{18}O$		FOUND.			
		1.	2.	3.	4.
C	77.92	77.47	77.57	77.89	77.96
H	11.69	11.91	11.55	11.62	11.73
O	10.39	10.62	10.88	10.49	10.31

The above results would show the presence of a higher oxygenated compound besides thymol in the oil. The formula of this body $C_{10}H_{18}O$, was also established by taking its vapor density.

Sample of oil No. III. was submitted to partial redistillation only, the object being to obtain a larger quantity of the hydrocarbon. After redistillation a similar body as that obtained from the other samples distilled at 160° – 175° , and upon further treatment with metallic sodium, two fractions were obtained, (I.) at 160° – 163° , and (II.) at 163° – 165° C. Six ultimate analyses of these compounds gave the following results:

CALCULATED FOR $C^{10}H^{16}$		FOUND.					
		I. 160° – 163° C.			II. 163° – 165° C.		
		1.	2.	3.	1.	2.	3.
C	88.23	88.18	88.20	88.27	87.85	87.97	88.02
H	11.77	11.52	11.68	11.70	11.40	11.45	11.35
100.00		99.70	99.88	99.97	99.25	99.42	99.37

The above results show without doubt the presence of a hydrocarbon in oil of horsemint. To establish the correct formula of this body the molecular formula was arrived at by taking the vapor density of this compound.

From the hydrocarbon obtained it was tried to form a substitution product with hydrochloric acid. The terpene was treated with dry hydrochloric acid gas, at both cold and warm temperatures, but no crystalline compound separating. The resulting liquid though assumed a violet-red color, changing to dark-red.

Vapor Density. The vapor densities of the compounds found in the oil were ascertained. The method used was that of V. and C. Meyer.

The results of six experiments with the hydrocarbon found are as follows:

1. 0.100 gram of substance vaporized replaced 17.6 cbc. of air.
2. 0.090 " " " " 16.2 " "
3. 0.057 " " " " 10.1 " "
4. 0.068 " " " " 12.2 " "
5. 0.089 " " " " 15.6 " "
6. 0.117 " " " " 20.6 " "

These figures with the observation of the barometric pressure, the temperature of the water, and also the tension of vapor of water, gave on calculation the following vapor densities:

Calculated vapor.

Found.

Density for $C_{10}H_{16}$. = 4.71.	1.	2.	3.	4.	5.	6.
	4.81	4.65	4.74	4.73	4.82	4.75

These all correspond sufficiently close to that of $C_{10}H_{16}$.

The vapor densities of the oxygenated compounds are as follows:

I. *Thymol*, $C_{10}H_{14}O$.

Calculated vapor.

Found.

Density for $C_{10}H_{14}O$. = 5.19.	1.	2.	3.
	5.22	5.14	5.16

These figures correspond also very well with $C_{10}H_{14}O$, and upon calculation that formula was arrived at.

II. *Higher compound* $C_{10}H_{18}O$.

Calculated vapor.

Found.

Density for $C_{10}H_{18}O$. = 5.33.	1.	2.	3.
	5.30	5.35	5.37

On calculation with these results, this showed also the formula of that body to be $C_{10}H_{18}O$.

Polarization. The action of polarized light upon the compounds obtained was noted; that of the hydrocarbon and of the oxygenated compounds. With a 200 mm. tube the following readings were made:

$C_{10} H_{16}$ —Fraction I. (160°–163°) gave	—34°·50.
“ II. (163°–165°) “	—32°·40.
$C_{10} H_{14} O$ —Thymol (230°–232°) “	+ 60.
$C_{10} H_{18} O$ — (240°–242°) “	+ 1°·10.

From the above will be seen that the hydrocarbon turns the plane of polarization strongly to the left, while with the oxygenated compounds it is slightly turned to the right.

Acids obtained by saponification.—100 grams of the oil from sample No. III were treated with a solution of 10 grams of caustic potash in 100 grams of water, and boiled for eight hours in a flask with an upright condenser. The alkaline liquid was separated from the oily layer, which was then acidified with sulphuric acid. This produced two layers, (I) a yellowish aqueous liquid, and (II) a dark brown oily layer, floating on the surface; the former was separated from the latter by means of a wet filter.

The dark brown oily liquid (II) was exposed to a temperature of —15° C, which then became solidified. This was dissolved in alcohol and mostly decolorized by means of animal charcoal; but on exposure again to the above degree of cold nothing crystallized out, neither from alcohol nor from ether.

The aqueous filtrate (I) from this oily liquid was diluted with water and distilled as long as the distillate had an acid reaction. The distillate was colorless, of peculiar odor, and gave the following reactions:

1. With conc. H_2SO_4 and ethyl alcohol produced the odor of some fruit ethers, prominently that of butyric ether.
2. With $HgCl_2$ on boiling for some time produced white precipitate of Hg_2Cl_2 , which was blackened by ammonia.
3. On addition of H_2SO_4 , a rod moistened with NH_4OH , produced white fumes when held into the tube.
4. Fe_2Cl_6 caused a violet-pink color on addition of a few drops, when more of the reagent was added became brownish, and on boiling a light-brown precipitate formed.
5. With $AgNO_3$ caused a reduction of the salt on boiling for some time.

A lead salt was formed from this acid distillate by digestion with lead carbonate. The filtrate was evaporated to dryness and the residue treated with 95 per cent. alcohol.

The filtrate (I) from this was then tested for *acetates*, the residue (II) not soluble in alcohol for *formates*.

The alcoholic solution (I) was evaporated to dryness, redissolved in water and then gave the following characteristic reactions for *acetates*:

1. With AgNO_3 a white precipitate formed, which changed not until after some time.
2. On heating the residue obtained by evaporation of a small quantity of the liquid with As_2O_3 the odor of kakodyl was produced.
3. With Fe_2Cl_6 a dark red color was produced, and on boiling a brownish precipitate formed.
4. With concentrated H_2SO_4 and ethyl alcohol, the odor of fruit ethers was produced, prominently that of butyric ether.

The residue (II) not soluble in alcohol was dissolved in water and then gave the following reactions for *formates*:

1. With AgNO_3 , a white precipitate formed, which on boiling darkened and became black.
2. Fe_2Cl_6 produced a dark-red coloration.
3. With concentrated H_2SO_4 and ethyl alcohol the odor of formic ether was developed.
4. HgCl_2 produced on boiling for some time a white precipitate of Hg_2Cl_2 , which was blackened by NH_4OH .

From the above reactions the presence of acetic and formic acids were indicated, but both existing in small quantity; also the presence of a small quantity of butyric acid. The oil itself having a neutral reaction, the above acids exist probably as compound ethers.

Summary of results.—From these investigations the following are the most important constituents of the oil:

I. A hydrocarbon, of the formula $\text{C}_{10}\text{H}_{16}$, which has not previously been examined. It is *lævogyrate*, and is present to the amount of about 50 per cent.

II. Thymol, $\text{C}_{10}\text{H}_{14}\text{O}$, present to the extent of about 25 per cent., which is *dextrogyrate*. This body it seems is present in the freshly distilled oil in a condition which will not crystallize, even at a low temperature; but by age gradually becomes crystalline and separates, without, as far as appears, any change in chemical composition.

III. Higher oxygenated compounds, comprising $\text{C}_{10}\text{H}_{18}\text{O}$, and probably others. This portion is also *dextrogyrate*.

IV. *Formic acid*.—1. Its silver salt was reduced on boiling the solution. 2. Its lead salt was insoluble in alcohol, and gave characteristic reactions. 3. The free acid reduced HgCl_2 to Hg_2Cl_2 on boiling.

V. *Acetic acid*.—1. Its iron salt dissolved in water with bright-

red color, and was precipitated on boiling. 2. Its lead salt, when heated with As_2O_3 , gave the kakodyl reaction. 3. The free acid caused the formation of white fumes with NH_4OH .

VI. *Butyric acid*.—Was detected by its odor, and exists in very small amount.

The oil having a neutral reaction, these acids probably exist as compound ethers; but are present in small amount only.

ANALYSIS OF THE LEAVES OF EUPATORIUM PURPUREUM.

BY FRANK M. SIGGINS.

A contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

Read at the Pharmaceutical Meeting, February 21.

Fifty grams of the drug in No. 60 powder were exhausted with petroleum ether, the solid extract of which amounted to 6.99 per cent. of the weight of the drug. This extract had a pale greenish color, with the odor of the drug, and an insipid, greasy taste. On heating in an air-bath at $110^\circ C$. it lost .186 per cent. of its weight, representing the volatile portion. It was slightly soluble in cold alcohol, and wholly so in hot alcohol, but precipitated on cooling. On filtering this solution and allowing it to evaporate spontaneously, a white granular wax was obtained which was not examined.

The drug after thorough evaporation of the petroleum was exhausted with ether. The solution thus obtained had a bright-green color by transmitted light, but brownish-red by reflected light, showing abundant evidence of chlorophyll. The solid extract obtained with the ether amounted to 2.97 per cent. of the weight of the drug. This extract had a dark-green or blackish-green color, was hard when cold, but became soft at $80^\circ C$.; was insoluble in cold water, but partly so in hot water, to which it imparted its bitter taste, and which the water retained on cooling. With this aqueous solution potassio-mercuric iodide gave no precipitate, but potassium tri-iodide gave a bulky brownish-red precipitate, which slowly changed to a light-yellow and indicated the probable presence of an alkaloid; other reactions, however, showed that this bitter principle is not an alkaloid but a glucoside.

The drug was then exhausted with alcohol, to which it yielded an

extract of 2.14 per cent. of its original weight; it had a dark-green color, was sparingly soluble in water, and had a slightly bitter taste. The aqueous solution gave a light precipitate with potassium tri-iodide, but as this was due probably to only a small part of the bitter principle which had escaped solution in the ether it was not further examined.

The drug was then exhausted with distilled water and yielded 14.20 per cent. of extractive matter. 20 cc. of this aqueous solution were treated with 60 cc. of absolute alcohol, and the precipitate representing the mucilage was collected, dried and weighed, yielding 4.8 per cent. The filtrate was evaporated to syrupy consistency, and treated with four volumes of absolute alcohol, the precipitate collected as before, and representing the dextrin, amounted to 4.75 per cent. The filtrate, representing sugar, evaporated to dryness, yielded 3.8 per cent.

The drug was then exhausted with a 2 per cent. aqueous solution of sodium hydrate, and yielded to it 16.30 per cent. of its weight. This solution, acidified with acetic acid and precipitated with alcohol, yielded 7.20 per cent. of albuminoid matter.

Exhaustion of the drug with a 2 per cent. aqueous solution of hydrochloric acid yielded 6.91 per cent. extractive. On treating the solution with sodium hydrate and collecting the precipitate representing calcium oxalate, 1.8 per cent. was obtained.

The active principle of this drug is evidently a glucoside of a bitter taste, soluble in ether, alcohol and water, and should be further examined. The other constituents are not materially different from those found in many other plants of this natural order, as seen by the following summary :

SUMMARY.

Ash.....	4.16	
Moisture	5.54	
<i>Petroleum ether extract</i> : Volatile oil (.18), wax, resin and chlorophyll.....	6.99	
<i>Ethereal extract</i> : Bitter principle, resin and chlorophyll	2.90	
<i>Alcoholic extract</i> : Bitter principle, resin and chlorophyll	2.14	
<i>Aqueous extract</i> : Mucilage.....	4.80	
Dextrin	4.75	
Sugar.....	3.80	14.20
<i>Dilute soda extract</i> : Albuminoids (.720), etc.....		16.30
<i>Dilute hydrochloric acid extract</i> : Calcium oxalate (.180) ...		6.91
Lignin and cellulose		37.00
Loss.		2.96
		<hr/> 100.00

ANALYSIS OF POKE ROOT.

By WM. A. PARTEE, PH. G.

Abstract from a Thesis.

The root of *Phytolacca decandra*, *Lin.*, was examined according to the scheme of Dragendorff's Plant analysis. The air-dry powder was found to contain 10 per cent. of moisture, and yielded 11.2 per cent. of ash, consisting of the chlorides and sulphates of potassium, magnesium, aluminium and iron, potassium predominating. The gases given off on burning the root produced dizziness.

Petroleum spirit extracted from the root 0.23 per cent. of soluble matters, which on evaporation were left as a semi-solid brown translucent extract, free from fat, but containing a wax melting at 109°C.

Treatment of the powder with ether yielded 0.18 per cent. of extract, which did not respond to tests for alkaloids, and from the alcoholic solution of which water precipitated a bright yellow powder, which could not be obtained in crystals.

Absolute alcohol dissolved from the residuary powder 1.42 per cent. of soluble constituents. On slow evaporation to a small bulk, the tincture yielded an extract containing a few crystals. The aqueous solution of the extract, tested with ferric chloride and gelatin, gave evidence of the presence of tannin, and after precipitating this with lead acetate, Fehling's solution showed glucose. A much larger precipitate of cuprous oxide was obtained from the aqueous solution which had been previously boiled with diluted sulphuric acid, thus indicating the possible presence of a glucoside. Precipitates were also obtained with tannin and potassio-bismuth iodide, but an alkaloid could not be observed in the aqueous or acidulated solution, which had a bitter taste, an unpleasant odor and, on vigorous agitation, a decided foamy appearance.

About 200 gm. of the root were now treated with strong alcohol, and the extract boiled with a small quantity of absolute alcohol, from which, on standing, some acicular crystals separated. The aqueous solution of the extract freed from tannin as before, was acidulated with sulphuric acid and agitated successively with petroleum spirit, benzol and chloroform; then rendered alkaline and the same treatment repeated; but no residue was obtained from these solvents.

The powdered root exhausted with alcohol yielded to water about 15 per cent. of soluble matter. After precipitating the gum with alcohol (66 per cent.), the filtrate was evaporated, the residue treated

with chloroform and this solution evaporated; the residue thus left gave, with sulphuric acid, a reddish color, which may be due to saponin.

OLIVE CULTURE IN CALIFORNIA.

By JAMES E. C. BELL.

Read at the Pharmaceutical Meeting, February 21st.

The extent to which foreign olive oil is now adulterated is a matter that would justly cause serious apprehension were it not for the fact that we have within our own country the means of relief. California has for several years past produced a limited supply of pure olive oil of very superior quality. The olive tree was introduced at the time of the founding of the Missions by the Jesuit priests during the twenty or thirty years beginning with 1769. Orchards of from a dozen to one or two hundred trees were planted for the use of the Padres, and many of those trees still survive, adding much by their graceful proportions and striking foliage to the picturesqueness of the surroundings of the Missions, which, with few exceptions, are in ruins. The writer has often rested in the shade of some of these trees planted more than one hundred years ago. It will thus be seen that the introduction of the olive tree is coeval with the founding of the Missions. The latter received their death blow in 1833 by reason of the confiscation of their lands by the Mexican Government, while the former still flourishes in more than pristine vigor. It was not until 1872, however, that olive orchards were planted with a view to extensive oil production. In that year Mr. Ellwood Cooper, of Santa Barbara, planted the nucleus of what is now one of the finest olive orchards in the world. Having demonstrated that the industry could be made profitable, his example has been followed by others, so that now there are productive orchards in San Diego county (Mr. Frank A. Kimball of National City), near San José (Mr. Edward E. Goodrich of Quito Olive Farm), and at several other places in the State. The trees are now being extensively planted, and the day is not far distant when the difficulty of getting pure olive oil will not be as great as it is now. The climate and soil of California are peculiarly adapted to olive culture, the chief difficulties now in the way being the high price of land and labor. These obstacles will doubtless be gradually overcome, and then pure olive oil will be obtainable at a much lower price than at present.

Virgin olive oil in full sized bottles now sells on the Pacific Coast at two dollars a bottle wholesale. Mr. Cooper and Mr. Goodrich, both state that the demand for their respective products is much greater than the supply. The cost is a serious bar to its general use at present, but not to those who wish pure oil.

The limits of this article preclude more than a mere outline of olive culture in California. Much interesting matter must therefore be left out and only the main points mentioned.

The trees are propagated from cuttings, taken from sound growing trees, during the months of December and January, and carefully trenched in a loose, sandy soil in a shady place. The ground of the intended orchard is thoroughly prepared by proper cultivation, and in February or March the cuttings are permanently planted about twenty feet apart. Theoretically the trees should be propagated from the seeds as they would be better rooted and more symmetrical, but in practice this method has not proved successful. The trees usually produce some fruit the fourth year from planting, and thenceforward the yield increases, alternating a light with a heavy crop. A few trees at four years have produced over two gallons of olives, and at eight years thirty gallons. The average yield is, of course, much smaller than this. A tree in the San Diego Mission orchard has produced 150 gallons of berries in a year. The fruit is generally ready for picking in November, but sometimes is not sufficiently matured before the middle of January. The oil made from olives picked before fully ripe and just after they become purple, is lighter in color and more fragrant than that from riper fruit. The picking is done by means of ladders attached to wagons which are driven from tree to tree. This method is preferable to that employed in Europe, where the fruit is knocked with poles and picked from the ground.

After picking, the fruit is freed from leaves and imperfect berries by passing it through a winnowing mill, when it is either dried in the sun for about two weeks, or exposed to artificial heat at a temperature of 110° to 130° F. When the moisture has been sufficiently evaporated the fruit is crushed by stone rollers, and pressed out in a manner almost identical with that used in the old-fashioned beam cider-press. The cheeses are three feet square and three inches thick, enveloped in coarse linen cloth, about ten cheeses being put in at one pressing. The expressed liquid is allowed to stand in tanks from two to three months by which time the oil rises to the top and is drawn

off. The pomace is re-crushed, treated with hot water, and, on pressing, a second quality of oil is obtained. The oil is clarified by being passed through a filtering column composed of five or six compartments with sieve bottoms on which cotton batting is placed. Heat facilitates this process, but is liable to injure the oil, and hence is not used in filtering the best oil. The oil is finally bottled, kept in a moderately cool place, not exposed to sunlight, and agitated as little as possible.

Pickled olives are prepared in various ways. In general, the process is to deprive them of bitterness by steeping them in brine, or in water containing lye, for varying periods, thoroughly washing to free from alkali, and preserving in a strong solution of the best Liverpool salt.

From what I have said it appears that if pharmacists and other consumers of olive oil are willing to pay the price necessary for an absolutely pure oil, they can obtain it of unsurpassed quality in California. The price given is unusually high, owing to a short crop last year, and the excellent reputation that the oil has gained on the coast. A prominent producer of oil informs me that the prices will probably be greatly reduced when the new product now in process of manufacture is placed on sale. It is earnestly to be hoped that this new addition to our home industries will receive the encouragement and support it so well deserves.

HONEY PRODUCTION IN CALIFORNIA.

By J. E. S. BELL.

Read at the Pharmaceutical Meeting, February 21.

Southern California is justly celebrated for the quality and variety of its fruits, but comparatively few persons on this side of the Rocky Mountains are aware of the extent to which honey is produced there, and the excellence of the product. Believing that pharmacists and other consumers will be interested in knowing where they can procure honey of unsurpassed quality in any desired quantity at a reasonable price, I have been led to prepare this brief account of its production on the Pacific coast.

The honey producing district includes San Diego, Los Angeles, Ventura, Santa Barbara and San Bernardino counties, together with portions of those adjacent. The primary requisites for an apiary are

a suitable location, plenty of "bee-feed" and convenient water. The apiaries, or "bee-ranches," as they are commonly called, are mostly located in canyons of the Coast Range Mountains, whose slopes are, in many places, densely covered with several varieties of wild sage and other honey-bearing shrubs and trees. In addition to these sources of honey supply, the so-called grasses commonly known as *wild alfalfa* (*Medicago sativa*, Linné) and *alfilaria* or pin grass (*Erodium cicutarium*, L'Heritier), are much utilized by the bees in gathering in their supplies. Usually from one hundred to three hundred colonies are kept in one place, the number depending chiefly upon the extent of the range. The hives are made in two compartments, the upper one, called a super, being removable.

The usual size is fourteen by nineteen inches, inside measurement, and ten inches deep, the size of the super being the same. Each compartment is supplied with eight or ten frames placed longitudinally, and supported upon the rabbeted upper edge. A movable horizontal partition separates the two compartments, by which the bees are confined to the lower part of the hive, which is often necessary. The season opens usually about the beginning of March, and continues until the close of July. When fully at work a large apiary presents a scene of activity not often seen elsewhere, for in addition to the storing of honey, swarming occurs frequently to the extent of fifty swarms a day. In a good season it is not uncommon for the number of colonies to be doubled. The method of extracting honey, while familiar to many, may not be without interest. The frames containing the filled combs are taken to the extracting room, where the ends of the cells are sliced off with a long flat-bladed knife. The frames are then placed in the extractor, which consists of an upright tank with a vertical shaft and from four to eight radial arms, supporting hinged wire cages of sufficient size to admit the frames and support the combs. By means of a simple or geared crank the shaft is rapidly revolved alternately to the right and to the left, and in a few minutes the contents of the comb are thrown out against the sides of the tank and collect at the bottom, whence the honey is drawn off into storage tanks, to be kept until canned and shipped. The emptied combs are then replaced in the hives to be refilled, which process is repeated a number of times with the same comb, being continued until the comb is destroyed. When it is understood that the amount of bee energy required for one pound of wax will produce twenty pounds

of honey, the object of the above mentioned process will be apparent. "Comb foundation" is largely used in order to save unprofitable energy. It is made by passing thin sheets of wax between metal rollers whose surfaces are so arranged as to produce an exact reproduction of the central partition of a honey comb. This is fastened into the frame with a little melted wax, and the bees build out the cells just as if they had made the entire comb.

The refuse combs, fragments of combs, scraps, etc., are put into the "sun-extractor," in which, by exposure to the sun's rays, the honey is rendered less viscid and slowly drains off. This product is of course inferior, and is not mixed with the centrifugally extracted honey, being reserved for the bees to forestall a possible honey-famine, which, owing to unfavorable seasons and improvident extraction, sometimes occurs.

It is said that glucose is used not only to feed bees but also to adulterate honey. I do not know to what extent this practice obtains elsewhere, but a long residence in the honey districts of California, and frequent visits to a large number of apiaries, confirms me in the belief that glucose is not used for either of these purposes there. I have never seen any glucose at an apiary, and the fact that it would be quite as expensive as the honey itself, would preclude its use.

California honey is usually very light colored, which fact leads many people to believe that it is not pure, but to those who thoroughly understand the circumstances under which it is produced this seems to be an entirely unfounded prejudice. The amount of honey turned out in a single apiary seems to those unaccustomed to such things, enormous. Thirty tons of extracted honey have been produced in a single season in an apiary of three hundred colonies. Indeed, three hundred pounds per colony is not uncommon, a super often being filled once in seven days. This large yield depends to some extent upon the assistance given the bees by the apiarist, but chiefly upon the season. If the preceding winter has been dry, or if there is much fog during the period of honey production, the yield will be greatly lessened, and sometimes is barely sufficient to tide the bees over until the next season. Formerly much loss was occasioned in this way, but now a sufficient portion of honey is always held in reserve to keep the colonies in a strong healthy condition.

The bulk of California honey is shipped in cans varying in size from twelve to sixty pounds. It can also be obtained in smaller cans and glass

jars if desired ; about one-tenth of the entire amount is shipped in the comb. During 1887 there were shipped to the East from Los Angeles 1,256,210 pounds, and from San Francisco 1,090,000 pounds, together with 250,000 pounds of comb honey. Canned honey usually sells at the apiaries at from four to six cents per pound. I have frequently bought honey of superb quality for five cents per pound. In car load lots it can be laid down in any eastern city at from two to three cents a pound for freight. It could be sold with profit by retail dealers at ten to twelve cents. Last season was unfavorable for honey production, and in consequence the quality is not up to the standard although the price is higher than usual. In view of the figures given above as to quantity and price it would seem that there is no sufficient reason why all persons who use honey for domestic and other purposes cannot be fully supplied. The honey of California is unsurpassed by any in the world, and nowhere else can honey of equal quality be procured in such large amount. There are reliable merchants in each of the counties named who can supply honey of the best flavor and purest quality in any desired quantity from a single can to a car load, at prices entirely within the reach of all who are accustomed to the use of pure articles of food.

PURIFICATION OF METHYLIC ALCOHOL.

BY JOSEPH EMIL HUBER, PH.G.

From an Inaugural Essay.

Methylic alcohol, also known as wood spirit, wood naphtha, or wood alcohol, was discovered in 1812 by P. Taylor, by subjecting wood to destructive distillation. It is obtained mixed with different compounds, and after being separated from the tarry products, is carefully redistilled, treated with quick-lime, and again distilled, and then treated with sulphuric acid, allowed to stand some time, decanted, and, as before, redistilled. In this condition it still has an empyreumatic odor. To obtain a pure product a moderately pure alcohol is treated with pure oxalic acid till saturated ; after heating it awhile, and, on cooling, crystals of oxalate of methyl form, having the formula $(CH_3)_2 C_2 O_4$. This, after being warmed and liquefied, is filtered and put in a flask of suitable capacity, is decomposed by either caustic soda or potash, using an inverted condenser, and heating till the reaction is supposed to have finished, the products being sodium or

potassium oxalate and methyl hydrate. Pure methylic alcohol possibly could be used in pharmacy as a solvent, and, in some instances, take the place of the more expensive ethyl hydrate; but the above process, owing to the large amount of potassium or sodium hydrate required to decompose the oxalate, is quite expensive.

After having tried all the different processes recommended in the books, I came to the conclusion that neither of these yielded a sufficiently cheap product; and lime suggesting itself as a cheap reagent for the purpose, I began a series of experiments with an alcohol that boiled at 68°C . and had a specific gravity of .826. By treating with oxalic acid methyl oxalate was formed. The still being ready a quantity of dry carbonate of potassium was added, and then the lime in small lumps, quickly connecting with the condenser. In a few minutes the reaction goes on by itself, or sometimes requires the aid of a little heat; distillation is stopped when but about one-sixth of the quantity is over.

As it first comes over methyl alcohol is odorless, and keeps so for quite awhile, but on exposure to the atmosphere it soon acquires that well-known peculiar odor, but not as strong as the commercial alcohol, and not empyreumatic. Then, after treating with carbonate of potassium, distilling and adding a few grains of permanganate of potassium to the distillate the odor is destroyed, but comes back again, though more pleasant and less disagreeable. In this condition, and by a little more purification, I think it can be used in some preparations.

The advantage of lime is its cheapness, and that by hydration it produces enough heat to start the reaction, and to vaporize the alcohol at the same time.

Methyl oxalate cannot be decomposed by heat when in a solution of water; but on heating in the air it is decomposed.

The alcohol obtained by that process had the specific gravity .889 and contained still some water,¹ which, I think, can be extracted by careful distilling from K_2CO_3 . Its boiling point is 66°C .

Antiseptic Petrolatum.—Brondel's formula, as printed on page 103 of this volume, contains an error in the quantity of corrosive sublimate. The correct formula is as follows: Corrosive sublimate, 0.10; oil of eucalyptus, 10; soft paraffin, 100 parts.

¹ According to the table of Duclaux the specific gravity indicates about 70 per cent. by weight of methyl alcohol.—EDITOR.

FORMIC ACID: ITS DETECTION AND ESTIMATION IN ACETIC ACID AND ACETATES.

A Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

BY FRANK X. MOERK, PHG.

Read at the Pharmaceutical Meeting, February 21.

In a paper on mercurammonium chlorides published in the recent issue of the *AMERICAN JOURNAL OF PHARMACY*, the peculiar effect of acetic acid on these compounds, as also on mercuric chloride, was noticed. The peculiarity was the reduction of the mercuric salt and formation of mercurous chloride. This reaction has since been investigated, and is caused by the presence of formic acid in the acetic acid used.

A solution of mercuric chloride was boiled for one hour with a portion of the acetic acid, at the end of which time the odor and reactions of acetic acid were easily recognizable. The mixture was filtered, to remove the mercurous chloride which was deposited, and to the filtrate added carbonate of sodium, effervescence occurred showing the presence of free acid; to another portion was added potassium iodide, a red precipitate of mercuric iodide indicating the presence of mercuric salt. This proves that acetic acid, if pure, will not reduce mercuric chloride, and that the reduction was due to a foreign substance, as was shown by adding a fresh portion of the acetic acid to some of the filtrate and boiling; it again yielded a white precipitate of calomel.

To ascertain the effect of pure acetic acid upon the mercurammonium chloride, commercial acetic acid (No. 8) was boiled with mercuric chloride, the calomel filtered off, and a portion of this filtrate was taken and added to mercurammonium chloride; it did not dissolve an appreciable quantity without application of heat, but with the aid of the latter agent took up considerable of it, and even protracted boiling caused no separation of calomel.

In the preparation of pyroligneous acid, there are produced in addition to acetic acid, smaller quantities of formic and other acids. In the purification of this crude acid it is presumed that all acids other than the acetic are destroyed or separated. Not one of the standard works intimates the presence of formic acid either in the commercial or so-called chemically pure acetic acids.

The formation of mercurous chloride from the mercuric chloride is

a very sensitive test for formic acid, and it is not shared by oxalic, citric, or tartaric acids either free or combined, as was found by experiment. A solution of ammonium oxalate, however, is prone to decomposition, and after decomposition has set in the solution will give the reduction test with mercuric chloride. The reaction for this decomposition is as follows:

$(\text{NH}_4)_2 \text{C}_2 \text{O}_4 + \text{H}_2 \text{O} = \text{NH}_4 \text{HCO}_3 + \text{NH}_4 \text{CHO}_2$; the bicarbonate is shown by the effervescence with acids and the evolution of ammonia vapors on heating.

Other tests to prove the presence of formic acid, which were carried out with the acetic acid, are:

1. Boiling with silver nitrate, a black precipitate consisting of metallic silver.

2. Mercuric oxide dissolved in the acid on boiling separated mercurous formate, which, on further boiling, decomposed yielding metallic mercury.

3. The decolorizing of potassium permanganate in cold acid solution.

The estimation of formic acid was next attempted, but here the lack of processes was encountered. Only one method was found, and that in Watt's dictionary, the process consists in the precipitation of mercurous chloride from mercuric chloride in the presence of sodium acetate by boiling in dilute solution, and after filtration estimating the excess of mercuric chloride volumetrically with potassium iodide solution.

To ascertain if the use of sodium acetate did not furnish a source of error in that it was contaminated with formate, a specimen of *chemically pure* (so labelled) sodium acetate was boiled with mercuric chloride; a decided precipitate of calomel was obtained. This was sufficient to cause the rejection of the method as published.

The reaction for the reduction of mercuric chloride is given in "Kiliani and Miller."

$2 \text{HgCl}_2 + 2 \text{NaCHO}_2 = \text{Hg}_2\text{Cl}_2 + 2 \text{NaCl} + \text{HCHO}_2 + \text{CO}_2$, in which only one-half of the formic acid is decomposed. The following may represent the action of formic acid: $2 \text{HgCl}_2 + \text{HCHO}_2 = \text{Hg}_2\text{Cl}_2 + 2 \text{HCl} + \text{CO}_2$. The presence of free hydrochloric acid and of large quantities of chloride is stated to prevent the complete decomposition of formic acid; the results of two analyses sustain this. Ten cc. of the acid were weighed and diluted to 150 cc. with water; in this was dissolved 2 gm. of mercuric chloride, and the mixture boiled for one

hour. The calomel formed was filtered off, thoroughly washed, dried at 100° C. and weighed.

	Weight of Acid.	Weight of Hg ₂ Cl ₂	Amount of HCHO ₂	Percentage of HCHO ₂
No. 1.	10.820 gms.	0.240	0.0235	0.22
No. 2.	10.870 "	0.156	0.0153	0.14

The acid in other experiments was partly or completely neutralized with sodium carbonate before boiling; the precipitate in these cases was black, and consisted of mercury and calomel, but greater in amount. The hydrochloric acid liberated as in the above reaction, decomposed the sodium acetate liberating acetic acid, which does not interfere with the decomposition of the formic acid.

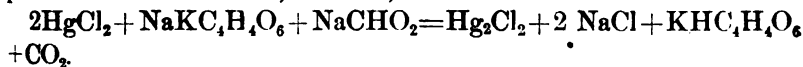
	Weight of Acid.	Weight of Hg ₂ Cl ₂	Amount of HCHO ₂	Percentage of HCHO ₂
No. 1.	10.410	0.620	0.0606	0.58
No. 2.	10.880	0.624	0.0610	0.56

Better results were gotten by using ammonium hydrate in quantity corresponding to the reaction :

$2\text{HgCl}_2 + 2\text{NH}_4\text{OH} + \text{HCHO}_2 = \text{Hg}_2\text{Cl}_2 + 2\text{NH}_4\text{Cl} + 2\text{H}_2\text{O} + \text{CO}_2$,
or about 3 cc. ammonium hydrate to 2 gm. mercuric chloride.

	Weight of Acid.	Weight of Hg ₂ Cl ₂	Amount of HCHO ₂	Percentage of HCHO ₂
No. 1.	10.560	0.693	0.0676	0.64
No. 2.	11.230	0.733	0.0719	0.64

This method yields constant results with acetic acids, but did not answer so well with formates. The ammonium hydrate added to neutral solutions containing mercuric chloride gives a precipitate of mercurammonium chloride. As the addition of ammonium hydrate is solely for the purpose of neutralizing the hydrochloric acid liberated, a number of normal organic salts were tried, through the use of which an organic acid is liberated which has no reducing action on mercuric chloride. Of a number used Rochelle salt was deemed the one best suited in that it could be easily obtained pure; using this instead of having tartaric acid liberated, there is formed a small quantity of acid potassium tartrate which, however, remains in solution.



The advantage of the estimation is that 46 parts of formic acid are sufficient to precipitate 470.2 parts of calomel; the delicacy of a quantitative estimation is increased proportionately as the numerical ratio

existing between the substance to be analyzed and the form in which it is weighed, and from which its percentage is computed, is greater.

A number of analyses were made with sodium and copper formates, and yielded decidedly satisfactory and constant results. The method was: Take 0.1 to 0.2 gm. of the formate, 2 gm. HgCl_2 , 1 gm. $\text{NaK C}_4\text{H}_4\text{O}_6$ and 150 cc. of water, boil for one half-hour, then add 10 cc. of hydrochloric acid, in order to dissolve any oxide or tartrate which might possibly be precipitated through some impurity, filter through a weighed filter, wash the precipitate with boiling water until the washings cease to precipitate silver nitrate, dry at 100°C . and weigh.

The sodium formate contained some moisture and carbonate.

Amount taken	Weight of Hg_2Cl_2	NaCHO_2 , found.	Percentage.
No. 1. 0.0988	0.668	0.09661	97.78
No. 2. 0.0988	0.669	0.09675	97.90
No. 3. 0.0988	0.6685	0.09668	97.84

The copper formate was not pure containing sulphate, and the calculations from the weight of mercurous chloride are given as formic acid. 0.178 gm. of the impure formate was taken in each case.

Weight of Hg_2Cl_2	Amount of HCHO_2	Percentage.
No. 1. 0.973	0.0952	53.48
No. 2. 0.972	0.0951	53.42
No. 3. 0.971	0.0950	53.36
No. 4. 0.976	0.0955	53.64

After thus showing the reliability of the analytical process, a number of samples of acetic acid and acetates were examined, and the amounts of formic acid or anhydrous formate of the metal are thus summarized :

Sample.	Percentage.
No. 1. No. 8 Acid.	0.642
No. 2. U.S.P. "	0.344
No. 3. U.S.P. "	0.020
No. 4. Glacial "	0.049
No. 5. $\text{Na C}_2\text{H}_3\text{O}_2$ (C.P.)	0.954
No. 6. $\text{K C}_2\text{H}_3\text{O}_2$	free, but contains considerable butyrate.
No. 7. $\text{Cu (C}_2\text{H}_3\text{O}_2)_2$	" " a trace of butyrate.
No. 8. $\text{Pb (C}_2\text{H}_3\text{O}_2)_2$	free.
No. 9. $\text{Zn (C}_2\text{H}_3\text{O}_2)_2$	contains both formate and butyrate in small quantities.

These examinations were carried out as with sodium and copper formates using, however, 10gm. of the samples. Especially in the case of the acids will there be seen the constant presence of formic

acid. The detection of the butyrate in the salts was by the odor, this becoming more or less apparent, depending on the quantity, on boiling the solution for half an hour in the test for formate.

Acetic Acid within the last few years has been made by a modification of the process first in use, consisting in carefully regulating the temperature which is maintained between 150°C and 162°C . The yield of acetic acid is as great as if the wood were heated to a higher temperature while at the same time it is free from the empyreumatic odor.

As the acids examined could not be vouched for as made by this modification, a sample was furnished me by Mr. Wallace Procter. The amount of formic acid in it was lower than in the other acids, but the method of analysis showed the presence of 0.017 per cent.

From this may be inferred that formic acid is a product, in larger quantity, of the destructive distillation of wood at higher temperatures, and that on the temperatures to which the wood was heated may depend the variable quantities of formic acid.

To purify acetic acid, this decomposition of the formic acid may be made use of; after estimating the quantity present, the proper proportions of mercuric chloride and Rochelle salt can be added, the mixture boiled for half an hour and the pure acetic acid distilled off.

COMMERCIAL TARTAR EMETIC.

By KASPAR HÖRNER, PH.G.

Abstract from a Thesis.

Three different samples were procured and examined according to the United States Pharmacopœia. All the samples when ignited left a black residue having an alkaline reaction. The aqueous solution was precipitated on the addition of hydrochloric acid, but no precipitate was observed if tartaric acid had been previously added. The acidulated solution gave an orange red precipitate with sulphuretted hydrogen. The absence of sulphate, chloride, calcium and the heavier metals was ascertained in a one per cent. solution acidulated with acetic acid, by testing with barium chloride, silver nitrate, ammonium oxalate and potassium ferrocyanide; and the absence of arsenic by testing with strong solution of soda in the presence of aluminium.

While the three samples, thus tested, answered to the requirements of the Pharmacopœia, a difference was observed in their solubility in

water. A quantity of the salt was prepared by boiling pure oxide of antimony and potassium bitartrate in distilled water, crystallizing and powdering. The tests mentioned above on being applied to this salt, showed the behaviour stated; but the solubility agreed very nearly with that given in the Pharmacopœia.

The following are the results obtained (the method for determining the solubilities is not described):

Solubility of one part of tartar emetic:

OWN MAKE.	No. 1.	No. 2.	No. 3.
In 17½ parts.	In 20 parts.	In 26 parts.	In 18 parts of water at 15° C.
In 3 “	In 3½ “	In 5 “	In 3½ “ of boiling water.

REDUCED IRON AND IRON PILLS.

BY HENRY McDAVIT, Ph.G.

Abstract from a Thesis.

Four samples of commercial pills of reduced iron were examined mainly with the view of ascertaining whether the iron would answer to the tests given in the United States Pharmacopœia. When dissolved in diluted sulphuric acid, the hydrogen gas given off was nearly odorless. A sufficient number of pills, corresponding to ten grains of reduced iron, was disintegrated in water, the undissolved portion collected upon a filter, and this was then introduced into a flask containing the quantity of potassium iodide and iodine required by the Pharmacopœia. The compressed pills, not being disintegrated by digestion with water, were powdered and treated as stated. None of the samples yielded a green colored liquid.

Of two samples of reduced iron tested in the same manner, one did not give a green colored solution; but the other did, and therefore contained at least eighty per cent. of metallic iron. Pills made of the latter sample showed the same behaviour; but it is not stated whether they were kept on hand for any length of time before testing them.

The absolute amount of metallic iron present was not determined.

Sodium sulphobenzoate as an application to wounds is highly recommended by M. Heckel, of Marseilles, who has employed it in the Hôpital St.-Mandrier, at Toulon. Stress is laid upon the fact that it is free from the occasional unpleasant effects of many other antiseptics used for the same purpose.—*N. Y. Med. Jour.* Dec. 24, 1887.

PERCOLATION OF BUCHU LEAVES.

EDITOR AMERICAN JOURNAL OF PHARMACY :

In reading the minutes of the Pharmaceutical Meetings in the January and February numbers of the JOURNAL, I noticed the remarks about fluid extracts and the exhaustion of buchu particularly. I was at the time engaged in making fluid extract of buchu by re-percolation, and had determined the amount of extraction in each portion of the third, fourth, fifth and sixth percolates, operating in each case on 473 grams of drug, and using the officinal menstruum. Recently I exhausted 100 grams by simple percolation to ascertain the total amount of extraction, which was 23.9 per cent., and also the amount in each 100 c.c. of percolate, which is given in the following table, as well as the results of re-percolation, reduced to percentage for comparison.

	Percola- tion.	By Re-percolation.			
	100 grams to ascertain amount of extraction.	Third Per- colation. 473 grams.	Fourth Per- colation. 473 grams.	Fifth Per- colation. 473 grams.	Sixth Per- colation. 473 grams.
1st. Portion.	19.1 per ct	18.38pr ct	19.87pr ct	21.29pr ct	20.25pr ct
2d. "	3.25 "	5.60 "	6.39 "	5.99 "	5.79 "
3d. "	0.95 "	1.72 "	2.26 "	2.06 "	2.16 "
4th. "	0.30 "	1.03 "	1.42 "	1.57 "	1.34 "
5th. "	0.20 "	0.45 "	0.93 "	1.51 "	1.25 "
6th. "	0.10 "	0.22 "	0.39 "	0.88 "	0.98 "
7th. "				0.44 "	0.56 "
Total extract per ct. of drug.	33.90 "	27.40 "	31.26 "	33.69 "	32.33 "
Reserved extract.	19.10 "	18.38 "	19.87 "	21.29 "	20.25 "
Extract carried forward.	4.80 "	9.02 "	11.39 "	12.40 "	12.08 "
Actual extract obtained.		22.60 "	22.24 "	22.30 "	19.93 "

In the re-percolation the portions of percolate were 473 c.c. each.

In the third, fourth and sixth percolations tall cylindrical percolators were used. In the fifth percolation an ordinary percolator was used, and when packed the drug was only about one-half as high as that in the tall ones, but it yielded much better results, giving a larger amount of extraction in the first, and less in the succeeding portions; showing that the extraction was somewhat retarded by the longer column of drug it had to pass through in the tall ones.

In each case the rate of percolation was about the same, being regulated by a rubber tube and adjustment of the height of the receiver.

Unaccountably the sixth does not show as complete exhaustion as the others, but I give the figures as obtained to show the freaks as they occur; but I believe that by using ordinary wide percolators throughout the series, that the amount of extraction in the first or reserved portion would show better results, and approximate the total extraction of the drug.

SHARON, PA., February 20, 1887.

Respectfully,

A. L. BECK, PH.G.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the American Journal of Pharmacy.

CACAO-COATED PILLS.—The butter of cacao is melted with gentle heat; the pills are rapidly agitated in it, and afterward in powdered starch, in which they are left to cool. The covering of cacao preserves the components of the pills against the action of air and light, and prevents the evaporation of volatile substances. *J. de phar. de Lisbon; Bull. gén. de thérap.* January 15, 1888.

DEXTRIN AS AN ADULTERANT OF EXTRACTS.—Mr. A. Pannetier writes in the *J. de phar. et de chim.* of January 15, 1888, that sophistication of this kind is more frequent than is ordinarily supposed. He gives the following method of testing such extracts. Two gm. of the substance is dissolved with trituration in 50 gm. of cold distilled water; and 5 gm. of liquid sub-acetate of lead are added, to precipitate the tannin, gums, alkaloids and coloring matters. The precipitate is then washed upon a filter with cold distilled water. The filtered liquor re-united to the water used in the washing, contains the excess of the sub-acetate of lead, certain alkaline salts which the extract may possess normally, and the dextrin, if any be present. The lead is then disposed of with sulphuric acid or a current of sulphuretted hydrogen. After filtering and washing the lead precipitate the liquor is evaporated to a fifth of its volume. Usually it is not necessary to carry the evaporation so far; but an equal bulk of alcohol of 96 per cent. must be added. If the extract is not adulterated the liquid remains clear; if dextrin be present, a precipitate goes down formed largely of dextrin united to a small quantity of such alkaloids as are insoluble in alcohol. The alkaloids will not sensibly

affect a calculation as to the amount of dextrin present, but the dextrin may be turned into glucose and calculated as such, if considered desirable.

MORCHELLA ESCULENTA, AND HELVELLIC ACID.—The analysis of Boström and Ponfich demonstrated that the morel (*morille*, French, *Morchel*, German), contains a principle which is poisonous for man and for several of the mammalia. Boehm and Kulz have succeeded in isolating the substance after a very long, very costly and sufficiently complicated proceeding based upon its solubility in water, alcohol and ether. The process is briefly described as follows: Take 5 kilograms of the morchella and treat with 10 kilograms of absolute alcohol; evaporate the alcohol and treat with absolute ether. Evaporate a second time and digest with absolute alcohol; decant, evaporate and treat with water. This liquid, evaporated *in vacuo* over sulphuric acid, gives an acid syrup which represents the pure toxic substance. The salt of barium ($C_{12}H_{18}BaO_7$), appears in the form of white flakes insoluble in absolute alcohol. The experimenters have named the substance helvellic acid. But they have not found a characteristic chemical reaction for it. *J. de phar. et de chim.*, Jan. 15, 1888.

OIL OF PANICUM.—In exhausting millet seed with ether we obtain a clear, yellow acid oil of an agreeable odor, and which easily deposits crystals. The liquid portion of the oil treated with oxide of lead does not produce glycerin; it gives a salt of lead soluble in ether, and which appears to be a linoleate of lead; and also a solid substance insoluble in ether, soluble in boiling alcohol, and fusible at $69^{\circ} C.$, which has not been analyzed. The crystals which deposit spontaneously in the oil are sparingly soluble in ether, alcohol and water, and very soluble in chloroform, sulphuret of carbon and benzin. They belong to the orthorhombic system and melt at $285^{\circ} C.$ They are inactive under polarized light, and their formula is $C_{18}H_{30}O$. This body, called by Mr. Kassner, *panisol* is not an alcohol; at least it does not furnish a derivative with acetic anhydride or chloride of acetyl. Heated to $165^{\circ} C.$ with hydriodic acid it decomposes into two products whose properties have not been fully studied.—*Bull. de la Soc. ch.*; *L'Union phar.* Jan., 1888.

HYGROPHILA SPINOSA.—This plant, according to researches by Jayesingha (*J. de phar. d' Anvers*), is very valuable for the treatment of dropsy. It is a powerful diuretic, which may be used in infusions of 62 gm. of the hygrophila, to 568 gm. of boiling water; to be taken

by small draughts within the twenty-four hours.—*Rep. de phar.*, Jan., 1888.

QUEBRACHO AND ITS ALKALOIDS.—Recent studies by Dr. Huchard as communicated to the *Bull. de la Soc. therap.*, appear to do little, more than to confirm the belief that the drug is chiefly of value in dyspnœa. He finds that all of the alkaloids are toxic, the most poisonous being quebrachine and hypoquebrachine, which cause convulsions and rapid death. Aspidospermine is the least toxic and the most useful in dyspnœa. He finds that some of the aspidospermine of commerce is but a mixture of all the quebracho alkaloids, which Hesse (*AMER. JOUR. PHAR.* 1882, p. 366) designated as follows: quebrachine, hypoquebrachine, quebrachamine, aspidospermatine and aspidosamine; the bark contains also quebrachol.—*Le Monde pharm.*, Jan. 20, 1888.

BROMHYDRATE OF CONICINE is reported as having been used successfully in the Children's Hospital at Berne, for the treatment of tetanus and trismus. The case of a child of seven years, suffering from both affections, is reported in *Nouveaux Remèdes* of January 24, 1888; the medicament was used hypodermically—two doses of .2 mgm. each at intervals of two hours, after which the child was able to swallow liquids. The same dose was given by the mouth until three doses had been given, which lessened the spasm. On the second day, four doses were given, and on the third, three, when the trismus disappeared, and the reflex troubles diminished. This is in accord with Schultz and Binz's experiments with conicine upon animals poisoned with brucine.

PHOSPHURET OF ZINC, according to recent experiments by Guidi, and by Canali and Betz, constitutes the best form in which to administer phosphorus, while it is easily divided, is stable and is well borne. Vigier recommends that the crystallized chemical be used in making the preparations; the dose should be equal to 1 to 3 mgm. of phosphorus *per diem*. The above-named investigators agree with Kassovitz (see *Moniteur therap.*, Nov. 7, 1887), as to the great value of phosphorus in rachitis. "In a very large number of cases cited, cure was complete; in others there was a notable amelioration, and the results were negative only when the medicament was not well tolerated or caused diarrhœa."

BIBORATE OF AMMONIUM is reported as having been successfully used in cases of nephritic colic. The doses are given at 1 gm. 25 cgm. every two hours until easy micturition is obtained; and afterward

every four hours until pain has ceased. Between the attacks 3 doses of 1 gm. each should be taken daily with meals, and the treatment should be continued for several months with interruptions of one or two weeks.—*L'Union phar.*, Jan., 1888.

A VERY SENSITIVE REAGENT TO THE SALTS OF COPPER consists of a mixture of pyrogallic acid with a solution of sulphate of sodium. With traces of copper the reagent gives a characteristic vermilion color.—*Repert. de Pharm.*, Jan., 1888.

NICKEL BATHS for plating are recommended by *L'Echo des Mines et de la Metallurgie* in accordance with the following formula: Sulphate of nickel, 1 kilo; neutral tartrate of ammonium, 725 gm.; etherized tannic acid, 5 gm.; water, 20 kilogram. The neutral tartrate of ammonium is obtained by saturating a solution tartaric acid with ammonia. The nickel salt must be rigidly neutralized. All is dissolved in two or three litres of water, and boiled for about a quarter of an hour, an amount of water being afterward added to make twenty litres, when the liquid is filtered or decanted. The liquor may be used indefinitely by supplying the same substances in the same proportions. Under a comparatively weak current of electricity it deposits a thick coating of nickel upon all metals in a very short time. The deposit is very white, ductile and homogeneous, and makes a smooth surface, free from scales, etc. The process will give heavy deposits upon plain or polished castings at a cost but a trifle greater than that of coppering. The same bath may be used for nickel galvanizing.

FAUNA OF THE TOMB.—Concerning this interesting but not very cheerful subject, Mr. P. Megin said at the meeting of November 14, of the French Academy of Sciences: "It is generally believed that the buried cadaver is devoured by worms as in the free air, and that these worms grow spontaneously. We know, however, these so-called worms are the larvæ of insects which arise from eggs deposited upon the cadavers. They consist of diptera, coleoptera, lepidoptera and arachnidæ, and we find that the time chosen by these organisms for the depositing of their eggs varies in accordance with the degree of decomposition undergone by the cadaver. The time varies from a few minutes to two or even three years after death; but the period of appearance is so regular and constant for each species that we may by an examination of the debris which they leave decide upon the age of the cadavers, that is, ascertain with exactitude the time of death.—*Moniteur Scientifique*, Jan., 1888.

THE HOME OF THE CINCHONAS.

By DR. H. H. RUSBY.¹

Leaving out of the question the cold, stormy and little known region of Cape Horn, South America is divided by the Andes into two portions, having almost nothing in common. The Cordilleras which extend along the eastern verge of the great Andean table land, while only a few miles in width, mark differences in soil, climate, productions and general appearance as great as any that are to be observed upon the globe, and present an obstacle to the interchange of organic beings far more effectual than the broadest ocean could constitute. Upon the Pacific coast rain is in many regions almost unknown, and the air is so destitute of humidity that it is said that the inhabitants never die, but dry up and are subsequently blown away in some gale of wind. Upon the other side rain is so constant that weeks may pass when the sun is seen for scarcely an entire hour, and the humidity of the atmosphere is sometimes so great that the clouds of rising vapor obscure the view of even the nearest objects. The west Andean region is marked over its greater extent by a total absence of trees, or even of large shrubs, many sections being destitute of even a vestige of green. The east Andean region on the contrary presents a scene of impenetrable verdure, reaching from near the summit of the mountains to the Atlantic Ocean, three thousand miles away. With the former region we have nothing to do. Except for a small portion of Chili it produces no important drug. The portion of Chili referred to yields soap bark, chequen and boldo, and it was here that I discovered the properties of the *fabiana imbricata*, or pichi, a drug that is meeting with a remarkably uniform success in the treatment of cystitis. I have stated that the eastern Cordillera forms a barrier to the interchange of species between the two regions. The barrier is not a direct one. It is perfectly easy for birds to fly, for quadrupeds and insects to migrate, and for seeds to be carried across this region at many points, but if they do so they immediately perish. It is the climatic condition which constitutes the direct barrier, and these conditions are the direct result of the mechanical obstruction constituted by the mountain chain referred to. The heated winds which sweep across the tropical Atlantic become surcharged with moisture. On striking the shore the changed condition disarranges the cloud equilibrium sufficiently to precipitate a portion of this moisture. But the clouds, thus lightened, as they sweep onward do not pass over a dry region, but one that is a perfect net-work of broad lakes and rivers; a surface that at certain seasons probably presents more water than land; so the little disarrangement that has been caused in the atmospheric conditions is at once atoned for by the soaking up of a fresh supply of vapor, which is again partially precipitated, and so on; so that the transit of these clouds across the Amazonian sylvas is a mere succession of partial unloadings and loadings, a journey of equalization, in the course of which those

¹ On the evening of December 1, 1887, Dr. H. H. Rusby delivered before the students and Alumni of the Philadelphia College of Pharmacy a very interesting lecture, profusely illustrated with specimens, on subjects connected with the researches during a sojourn in South America. From a stenographic report of this lecture by Dr. C. R. Morgan, we select a portion relating to the Bolivian home of the cinchonas, and intend to publish in the following numbers of the JOURNAL several parts of the same lecture relating to other topics.—EDITOR.

regions which are temporarily wanting in humidity, are fed from those which are better supplied. But that is not all; there is an additional and peculiar feature. The equalizing process is not only regional, but temporal as well, for at certain hours of the day there is in most sections a discharge of rain which is said to be almost as regular as the striking of a clock. For the most part these showers are comparatively gentle, as we should expect from the comparative uniformity of the conditions, but when these clouds have reached the mountains an entire change occurs in all their conditions. Up to this point they have, upon the whole, gained more than they have lost, and they reach the Andean foot hills like an M. D. who comes home from a meeting with his colleagues at five o'clock in the morning after hospitably entertaining some favorite guest, very top heavy with wetness.

What now are the conditions on which cloud precipitation depends? Only one, although it may be produced in a variety of ways; an increase of density. On striking the first range of hills, this increase of density is produced by compression of the clouds between the hills and other clouds that are pressing on behind them. They at once discharge great volumes of water upon the plains below. The cloud thus lightened endeavors to escape upward over the tops of the hills, but reaching the colder upper strata, there is another increase in density and fresh precipitation occurs. This operation is again and again repeated as the 250 miles of steadily increasing elevation are passed, until finally, the tattered remnants of the recent cloud dome find themselves among the jagged peaks of the highest ranges. From one or another of these peaks there is an almost constant discharge of electricity, and this completes the annihilation of the cloud-forces, the winds which cross to the other side carrying with them but the merest traces of moisture. Now there is a point upon this mountain slope where this strife among the elements seems more violent than elsewhere. A narrow belt of between three thousand and five thousand feet above the level of the sea where it seems that peak and forest have united in a resolution that no cloud shall pass without being broken to its centre. In the midst of this scene of vapory turmoil the cinchona has its home. Far to the northward, in the equatorial region, they creep up to a higher elevation, and in the Cochabamba region of Southern Bolivia the cinchona belt is limited upward to between five thousand and five thousand five hundred feet, and downward to two thousand five hundred or three thousand feet. The precise conditions of heat and moisture are hard to find, hence the small number of places where the cultivation of cinchona has been even partially successful. And hence the fact that the United States has no territory where the faintest hope of its production can ever be entertained. The water supply must be abundant and constant. Irrigation, however abundant, is entirely inadequate in the cultivation of these trees. The aerial as well as the subterranean portion must be bathed in moisture. It is true that there is a period of several weeks when the rains almost entirely cease. But this occurs just at the close of the rainy season when the earth is saturated with water, so that up to the re-commencement of the rains there is no period when the atmosphere, by evaporation from the surface of the earth and the exuberant mass of foliage, is not sufficiently humid. It is to be remembered that the supply of water does not cease with the cessation of the rains. Ten thousand feet of mountain slope lie back of the cinchona belt, and conserve the rain-fall in the crevices of the rocks and in

the tangled mass of roots and rootlets that for a depth of ten or fifteen feet almost constitute the soil, rather than ramify through it. This supply allows the water to trickle slowly along under the roots of the cinchona.

Just here we meet with a paradox. While the water supply must be constant, yet if it be unchanged disaster will certainly result. If the cinchona trees be planted upon a level tract where there is not sufficient drainage to immediately carry off the falling showers, they soon begin to droop and die. The temperature in this region seldom falls below 70 degrees, and is usually below 90 degrees. Under such conditions as these, the character of the vegetation may be readily inferred. Its luxuriance is nowhere exceeded. There are larger trees in Australia, but they stand independently of each other. The forests of Brazil are heavier, but there is not such a profusion of tender plants, parasites and gorgeous flowers. Here, however steep and high may be the cliff, there are sufficient large trees shooting upwards from its foot or supported upon its ledges, to form a frame for the dense net-work of vines that entirely conceal it from our view. Over the smaller mountain streams arch giant branches, concealing them from our downward view, and into the water droop gay festoons of flowering vines. Thus we gaze as it were upon a vast, irregular sea of verdure, and forget all the roughness of the surface below. Could these mountains be suddenly stripped of their verdant cloak of charity and exposed in all their roughness to our view, the scene of desolation would be appalling and pitiable, for nowhere does nature present such abrupt descents as here. Before us is a mountain side glittering with shining palms, whose tops alone are seen, and at its centre a slight depression, not noticeable but for a mountain stream that leaps out from the midst of its foliage and falls, a sheet of silver, among the lower tree tops, only to re-appear a hundred feet below.

We are traveling upon a little ledge, which runs for miles along the sides of an otherwise inaccessible slope, four thousand feet in height. Upon the left the road is bordered by tree ferns, whose delicately divided fronds, a dozen feet in length, brush in our faces, alternating with graceful bamboos which arch over our pathway.

Upon our right rises the cliff, but all hidden by a mass of our hot-house favorites—begonias, fuchsias, amaryllas, calceolarias, ferns, mosses and orchids, a new species at every turn of the road. Beautiful little grottoes are formed where the cascades come down, one of which would make the fortune of any florist who could reproduce it here. Except where the pathway is kept open by constant travel, and the lopping off of the encroaching vegetation, the earth itself is never seen. No one travels through the "*Monte*," as the tangled forest is called, without a *machete*, or enormous knife in his hand with which to cut away the undergrowth at every step, and allow him to examine well the ground upon which he is to tread, for a single careless step may precipitate him to his death.

Such is the home of the cinchona. A full history of its search, collection, shipment and culture would be virtually a history of the most enchanting regions in South America. But we can merely touch upon it. At first the collectors plied their trade in the vicinity of their own home. But soon the accessible supply became exhausted and the collector was obliged to make longer journeys into the forests, remaining weary days upon the journey, and bearing a thousand trials, privations and dangers. His scanty supply of food

must all be carried with him, for contrary to the general impression, these forests yield almost nothing in the way of a regular food supply. We are accustomed to read in novels about the wonderful production in tropical forests of berries and roots. Whenever a traveler in the stories of fiction is lost, he is always saved by going to the forests and collecting some roots and berries. The traveler in reality never finds them. He may occasionally come upon a spot in the forest where they are abundant and again he may go several weeks without finding anything.

Even the savage tribes depend upon their plantation for their subsistence. If now the *cascarillero* became lost in the forest, suffered some injury preventing him from traveling, became hemmed in by a sudden rise in the mountain stream, or suffered some like injury, he was in imminent danger of starvation. But it was not these conditions which caused the high price of cinchona bark when it was three and four dollars a pound. It was the monopoly which existed in the trade. In Bolivia, a single individual, through intermarriage with the family of the President, whose actions were those of an absolute despot rather than of a Republican executive, and by aiding the latter in plundering the national treasury, secured the forcible monopoly of the bark trade.

The prices paid were as low as possible without removing the stimulus to collection, and those charged as high as the world could be forced to pay. The mode of operating by this gentleman was as follows: Whenever he heard that some rival firm had sent a man in for the purchase of bark so as to antagonize him in his business, he immediately reported that fact to the President, his near relative. The President would have this man seized by his soldiers, accuse him of fomenting treason, punish him, often with his own hands, and order him to leave the country on pain of death. It seems impossible to us that a President could act this way. But I assure you that this President is now living in Paris upon several millions of dollars which he stole from the treasury; not embezzled, but actually stole, sending it out of the country at night: robbing the treasury of silver, and sending it out of the country at night as merchandise. This man was so bold as to seize the British Minister, who remonstrated with him for some of his actions, beat him, tied him upon a mule like an ordinary pack, and sent him out of the country with orders to never return. England did nothing in return for this affront. She considered the country beneath her notice and she has never sent any representative to that country since, but has abandoned it as a savage country, and Englishmen who go there, go without protection.

The profits of this trade were enormous, millions of dollars being realized. Large towns sprang up in the wilderness devoted especially to this industry. All classes pursued it to the neglect of everything else. When the business finally collapsed, most of the inhabitants fell back into absolute indolence. Under the process above described it soon became apparent that the supply of bark would become exhausted, and wise foreigners united in urging the producing governments to take steps towards perpetuating the native stock. But no adequate measures were taken, and finally the British themselves undertook the task. But the South American people, not satisfied with themselves neglecting these most important measures, forbade and obstructed the efforts of the foreigners, and even visited them with violent persecution. But in spite of all, the happy result was accomplished, and all of the most valuable varieties

of cinchona were successfully introduced to cultivation in the British provinces.

It is to be noticed here that the result is not so much due to the British government as to a few earnest individuals. The government itself did only what was barely necessary to render the project possible, and it did this grudgingly. It must ever be a stain upon English history, that an accomplishment of so much economic value to England, and of such vast benefit to humanity, should so long have gone unacknowledged. But such is the fate which throughout all time has attended efforts of this class. The individual or association, who shall explore in new and so-called unpromising fields, must summon all their fortitude to endure the malicious persecution, the cowardly indifference and ignorant misconception which for the most part attend such efforts. He who engages in such a work must be buoyed up by a consciousness that he works for eternity, and that the best part of right is its righteousness. At about the time that the plants exported to India had begun to produce seeds, the native supply of South America had become exhausted, and those whose business had thus failed were obliged to invest their capital in the planting and culture of the tree. So it happens that at the present time no bark, except an occasional bale, reaches the market which is not the product of cultivated trees. I had men out for two months searching the forests for wild trees, and so scarce is it that I assure you I succeeded in obtaining only three.

VARIETIES.

Influence of potassium iodide upon the elimination of mercury.—According to Dr. Souchow the elimination of mercury commences later, and the quantity eliminated is relatively less in those cases in which the patient takes potassium iodide in conjunction with the mercurial preparation. If the iodide is administered during or after the mercurial course, the quantity of mercury eliminated daily is lessened. The iodide, therefore, appears to prevent the elimination of mercury, instead of hastening it, as has been believed by some, and would seem to be useful in cases of mercurial poisoning.—*Boston Med. and Surg. Jour.*; *Jour. Am. Med. Assoc.*

Tonic and alterative properties of ferrous iodide.—Iodide of iron, according to Dr. Delmis (*Progrès Méd.*), belongs to those preparations of iron which possess the best "tonianaleptic" properties, combining the strengthening iron and the alterative iodine effects. Its efficacy is seen in chlorosis and anæmia, and it is of the highest value in tuberculosis, scrofulosis, and syphilis. Iodide of iron is easily soluble and soon passes into the blood, where it is rapidly split up and eliminated. In the urine the iodine appears quickly as sodium iodide; the iron, as iron oxide, is excreted more slowly. It is excreted as iodide of iron by the saliva, the milk, the sweat, and the bronchial mucus.

Acid solutions of corrosive sublimate as disinfectants.—Laplace has made a study of the effects of acid solutions of corrosive sublimate as disinfectants, and concludes as follows from his work, which was done in Koch's laboratories, at Berlin: Sublimate, with tartaric acid in solution, can be recommended as a surgical disinfectant dressing for the following reasons:

By combining the action of tartaric acid, we obtain the full action of sublimate

in fluids and surfaces containing albuminoids. Infected wounds should be irrigated from ten to twenty minutes daily; a single thorough cleansing is enough for fresh wounds, after which a dressing of tartaric acid-sublimate gauze is applied.

Tartaric-sublimate gauze does not interfere, in any degree, with iodoform and the other substances commonly used in surgery. It gives in the laboratory and in practice better results than sublimate alone. It does not irritate wounded tissues. Sublimate dissolves better in solution of tartaric acid than in water alone. The compound solution does not decompose in the tissues or dressings, and is cheap.

Solutions may be made after the following formulas:

Corrosive sublimate.....	1 part.
Tartaric acid.....	5 parts.
Water.....	1000 "

for irrigation.

For the preparation of dressings:

Corrosive sublimate.....	5 parts.
Tartaric acid.....	20 "
Distilled water.....	1000 "

may be used, in which dressing material should soak two hours, after which it may be wrung out and dried.

Laplace's investigations consisted of experiments in Koch's laboratory, and in von Bergmann's and Fehleisen's clinics. He had previously demonstrated that the efficiency of sublimate and carbolic solutions as germicides is greatly increased by the addition of hydrochloric acid.—*Deutsche medicinische Wochenschrift*, Oct. 6, 1887; *Med. News*, Nov. 5, 1887.

Koumiss peptones, by Dr. Anderson. The author describes this substance, which he has prepared, as follows:

It is milk, or milk and other foods; first, by the action of pepsin, of pancreatin, or of both, almost completely digested, and thereby converted into peptone, or still further split up, and then made into koumiss. In the process of peptonizing about twenty-five per cent. of water is driven off, and none is previously added. Koumiss peptones are, therefore, of about fifty per cent. greater food value than ordinary koumiss. They are more fluid, have a sediment of far greater impalpability, and are incomparably more digestible and easily assimilable than ordinary koumiss, or even than Russian fermented mare's milk. While the author of this paper claims to be independently a discoverer of ordinary koumiss, he is the acknowledged inventor and institutor of this, the highest expression of a perfect koumiss. It is of especial use in the most irritable and adynamic types of wasting diseases; and can be, and has been taken and retained, when all other foods, ordinary koumiss not excepted, have been rejected. Valuable lives have been saved which would have been lost but for its administration.

Hitherto I have spoken of the use of cane sugar in the making of koumiss, etc. I now come to speak of the substitution of honey. For years past seldom has cane sugar been used by me. In the preparation of ordinary foods, grape sugar, and sometimes sugar of milk, has replaced cane sugar on the ground of the disagreeable eructative and fermentative action the latter exerts when administered. This cannot be so great in the matter of koumiss; yet I have substituted honey for cane sugar, and principally for the following reasons: honey is more whole-

some, more nourishing, more digestible, and more physiological food than cane sugar. It produces a koumiss having a finer sedimentary deposit, increases the beauty and delicacy of flavor, and delays or prevents its becoming caseous.

Koumissed peptones are, equally with koumiss, the vehicles for the administration of such of the most important therapeutic agencies as are of use in particularly wasting diseases. But such medicinal agents are not added where the beauty and delicacy of flavor of either the koumiss or koumissed peptones are in any appreciable degree interfered with.—*Med. News*, Dec. 31, 1887; *Brit. Med. Jour.*

Lead poisoning from flour.—A very remarkable epidemic of lead poisoning has recently been investigated in three communes in the north of France. Upward of one hundred persons were suddenly attacked with violent symptoms, among which severe colic predominated. So serious did the condition of some of the sufferers become, that medical aid was obtained, and the presence in several patients of a characteristic blue line on the gums gave rise to the suspicion of lead poisoning. The water supply was derived from so many different sources that it could not be incriminated, and suspicion ultimately fell on the flour.

It was ascertained, on inquiry, that the affected persons had all obtained their flour from the same mill, but those who had partaken of rye bread were most severely attacked. The mill was gone over, and after a very long and painstaking examination, attention was directed to the tin buckets of the elevator which served to transport the rye flour from the grindstones. Several of these buckets had a dull, leaden appearance, and were found to have been "tinned" with lead. As doubts were entertained whether the quantity of lead from this source was sufficient to give rise to such severe symptoms, they were carefully weighed, and were found to have lost upward of five ounces of their weight. The wheaten flour, which passed through another elevator, was free from lead, and this was evidently due to none of these "leaded" buckets having been employed in its construction. The accuracy of the discovery was confirmed by the observation that those who ate rye bread exclusively were most severely attacked, while the others, who mixed the two flours, escaped with comparatively slight symptoms.—*Med. News*, Dec. 31, 1887.

A case of contamination of flour with metallic lead, which occurred in western New York, and resulted in the poisoning of over two hundred persons, of whom several died, was reported in the *AMER. JOUR. PHAR.*, 1886, p. 366.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, February 21, 1887.

The fifth of the present series of Pharmaceutical Meetings was called to order, and Mr. Alonzo Robbins was asked to preside. The minutes of the last meeting were read and approved.

The Registrar announced that he had received twenty volumes of public documents, some of them of a very interesting character, from the Hon. Matt. S. Quay, United States Senator from Pennsylvania; also the Year Book of Pharmacy, from the British Pharmaceutical Conference; the Calendar of the Pharmaceutical Society of Great Britain, for 1888, and the Proceedings of the

American Pharmaceutical Association. The Registrar was directed to return a vote of thanks to the givers of the various works.

The attention of the meeting was called to the large collection of valuable and rare drugs sent to the College by Mr. E. M. Holmes, curator of the Museum of the Pharmaceutical Society of Great Britain. The question was asked whether the insects marked "Red Flies" were cantharis; Prof. Maisch said they were not, that their scientific name was *Huechys sanguinea*; they had been examined by Mr. John Moss, and by him found to be destitute of cantharidin, although the odor of the beetles would induce one to think them similar in composition.

Prof. Maisch called attention to the odor of the leaves of the *Eucalyptus citriodora*, which so much resembles the verbena or lemon grass, and remarked that the oil of *Eucalyptus persicifolia* possessed the odor of peach leaves, and contained hydrocyanic acid; it would seem that there was some connection between the volatile oils and the morphological character of the leaves.

The bark of *Cinchona officinalis* in shavings was commented on as a novelty, and in this connection also, a sample of mossed calisaya bark was exhibited, which had been brought from Indian cinchona plantations and presented to Prof. Maisch by Mr. Wm. R. Warner. One specimen was marked false buchu leaves (*Empleurum serrulatum*); it is sometimes mixed with long buchu, from which it may be distinguished by examining the shape, apex and distribution of the oil cells. Mr. Procter moved that, although the receipt of the specimens had been acknowledged, a special vote of thanks should be sent by the Registrar.

Mr. Bell presented several specimens of *California honey* and of *olive oil*, the purity of which he felt well assured of.

Mr. Bell read a paper upon California Honey, and since writing it he stated that he had received a letter embodying considerable information in reply to some questions he had asked regarding the business of gathering it, and care of the bees; he also read a paper upon the culture of the olive for the purpose of obtaining the oil, an industry introduced nearly a century and a quarter since by the Jesuit missionaries; the paper was supplemented with information upon the subject by letters recently received from several growers. Prof. Maisch said that it seemed from the paper that the olives and seeds were all crushed together, while he had understood that in Italy they separated the seeds and pressed the oil from the pericarp only as the two oils were dissimilar in some particulars.

Mr. F. M. Siggins, of the present senior class, read a paper upon *Eupatorium purpureum*; the reading elicited some discussion. Prof. Maisch stated that the rhizome contained a peculiar principle resembling quercitrin, and thought it would be a good subject for investigation.

Mr. Schroeter read a paper upon *oil of horsemint*, which was listened to with a great deal of interest as the reader detailed many experiments he made with it.

Mr. Moerk read a paper upon *commercial acetic acid* which he examined in consequence of some reactions he observed when he was testing mercurammonium chloride, and found to contain formic acid. Mr. Procter referred to the acetic acid made by the imperfect carbonization of wood, and said that he considered it superior to other brands for the preparation of ammonium acetate

and for similar purposes. Prof. Maisch stated that toxicodendric acid also reduced mercuric chloride, and Mr. Pettigrew had some years ago corroborated his observation that in its chemical characters it resembled formic acid.

These papers were referred to the publication committee. Mr. Procter said that he had been experimenting with *agar-agar* or *Japan isinglass*; he found that one part in 200 of water was sufficient to give a good jelly, and that this should be made with as little disintegration as possible; it will emulsionize oils, but is inferior to gum for this purpose, and is more allied to that from Irish moss or sassafras pith.

Prof. Maisch asked whether *dextrin* or other *gum substitutes* of commerce had been experimented with for pharmaceutical uses since gum arabic had advanced in price so much. It was stated that some of the druggists had a variety of substitutes, but no one could say whether they were being much used, or how they were manufactured,

There being no further business, on motion adjourned.

T. S. WIEGAND, Registrar

EDITORIAL DEPARTMENT.

Medicine and Pharmacy at the International Exhibition at Brussels.—During the coming summer a grand international industrial exhibition will be held at the city of Brussels, for which occasion separate divisions have been organized for medical science and for pharmacy, the subjects relating to both of which were, in former international exhibitions, placed in other industrial groups. The intention is to have, at this exhibition, all products grouped according to their final destination, so that each branch of industry may be comprehensively studied by the comparison of the analogous products in use among the different nations.

The eleventh class has been assigned to medical science, and has been divided into five subdivisions, comprising medicine, surgery, hygiene, public assistance, and in one subdivision, balneology, electrotherapy, hydrotherapy, gymnastics, massage and allied branches. Each subdivision is again divided into a suitable number of sections and groups, in order to facilitate the proper classification of the exhibited articles. The president of the eleventh subdivision is Professor Stas of Brussels; the secretaries are Mr. Lentz, director-general in the Department of Justice, and Dr. Moeller of Brussels. A bureau has also been organized for each subdivision.

The thirty-fifth class has been assigned to the instruments, processes and products of pharmacy. Its president is Mr. Louis Créteur, president of the Royal Society of Pharmacy at Brussels; vice-presidents, Mr. Achille Jonas, vice-president of the Royal Society of Pharmacy at Brussels, and in 1876 delegate to the Centennial Exposition at Philadelphia, Mr. Ch. Bultot, pharmacist at Liège, and Professor J. B. Depaire, of the University of Brussels; secretaries, the pharmacists Victor Reding and Alexander Buson of Brussels. The three subdivisions comprise laboratory apparatus, pharmaceutical apparatus and products, and are subdivided into eight groups, as follows: 1. Utensils, instruments, publications, engravings, etc., of former times; 2. modern utensils and

apparatus of all kinds; 3. shop furniture, utensils and models; 4. vegetable drugs; 5. animal drugs; 6. mineral drugs and chemical products; 7. simple galenicals, like waters, confections, extracts and plasters in bulk and spread; 8. compound preparations, like capsules, pearls, lozenges, pills, wines, tinctures, elixirs, etc.

A number of problems have been selected, for the elaboration and solution of which special rewards and premiums will be awarded. Among these the following may be specially mentioned: 3. The best, most stable and economical ferruginous medicament, of easy preparation, for use in anæmia; 4. study of the derivation, preparation, characterization, quantitative examination and preservation of extracts; 5. retrospective exhibition, showing the influence of pharmaceutical and chemical progress on medicine; 6. the most favorable vehicles for medicines, considering rational preparation, preservation and influence on absorption; 7. the effects of desiccation on the active principles of plants; 8. nutritive value and modes of preparation of peptones, meat extracts, and other alimentary and nutritive substances; 12. best and most complete collection of antiseptics; 14. apparatus for sugar-coating pills on the small scale; 15. rotatory apparatus for making a limited number of pills (about 20), and capable to furnish about 8 kilos of pills per hour; 16. a cheap apparatus for evaporating without contact with air; 18. best drug mill; 20. lozenge apparatus, turning out one kilo of lozenges, with the name of the pharmacist, the price not to exceed 100 francs; 21. the alkaloidal strength of narcotic extracts prepared from fresh and from dried plants; 22. the microscopic structure, chemical composition and sophistication of articles of food. Other problems relate to fire-damp, fruit syrups, oleomargarin, the microscope, etc.

Collections intended for exhibition are required to be delivered at the exhibition building on or before April 15; the opening of the exhibition has been fixed for May 1st.

The chromate of lead poisoning to which we referred in our issues for August and October last, has been before the criminal court on January 27th. The baker, G. M. Palmer, was in five indictments, charged with selling adulterated cakes and buns, and with involuntary manslaughter. With the consent of the district attorney and the presiding judge, a plea of guilty of selling adulterated food was entered, and to the charge of involuntary manslaughter a plea of "nolo contendere," or of unwillingness to contend, which in effect is a plea of guilty for the particular case, but legally is not taken as a confession of guilt for any other purpose or proceeding. In the defendant's testimony it was stated that he had been in business for himself for twenty-five years; first had dealings for a yellow stuff in 1852 with G. W. Millett, a salesman; did not know its nature, and used it only for giving the cakes a rich yellow color, but not to save eggs; his first wife and three children died in 1884, and two other children in 1885 and 1886. Judge Finletter, in sentencing the defendant, took into consideration his evident ignorance of the injurious character of the coloring matter, his penitence as evinced by his disclosures, and the ruin in health, in business and in family. The sentence for selling adulterated food was six months imprisonment, and three months additional for involuntary manslaughter. Subsequently the judge reduced the total imprisonment to three months. Another baker, Fred. Schmidt, pleaded guilty to the charge of adulteration of food in having used "egg coloring" for his cakes, and was sentenced to imprisonment for six

months. The trial on the charge of involuntary manslaughter in causing the death of Anna E. Helm was postponed.

The third defendant was Albert Krumm, a manufacturer of noodles, in which by chemical analysis, the presence of eleven grains of lead chromate to the pound had been demonstrated. He claimed having at first in his business made use of turmeric, and that afterward he used a coloring matter under a chemist's certificate that it was harmless. It was also in evidence that he had admitted having discontinued the use of this color when the dangerous character of lead chromate was first made public, but had said that he was compelled to resume using it because he lost about fifty customers in one day by stopping it. The jury convicted the defendant, and the judge sentenced him to imprisonment for six months and to pay a fine of \$100.

PROCEEDINGS OF STATE PHARMACEUTICAL ASSOCIATIONS.

Missouri, pp 158.—The ninth annual meeting was held at Sweet Springs, June 28-30, 1887, and the next meeting will be held at the same place, on the second Tuesday (12th,) of June next. President for the current year is J. A. Gallagher, Kansas City; Treasurer, G. J. Meyer, St. Louis; secretary, G. H. C. Klie, St. Louis; local secretary, J. W. Eads, Warrensburg.

New Hampshire, pp, 34.—The fourteenth annual meeting was held at the Fabyan House, White Mountains, September 27th and 28th, 1887. The executive officers are N. S. Whitman, Nashua, president; C. B. Spofford, Claremont, secretary; F. A. James, Manchester, treasurer; and P. H. Kelly, Manchester, auditor.

North Carolina, pp, 56.—The eight annual meeting was held at Asheville, August 4th and 5th, 1887. The following executive officers were elected: F. W. Hancock, New Berne, president; A. S. Lee, Raleigh, treasurer; E. V. Zoeller, Tarboro, secretary, and H. C. Shannon, Goldsboro, local secretary. The ninth meeting will be held at Goldsboro on the second Wednesday (8th) of August, next.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Pharmaceutische Chemie. Von F. A. Flückiger. Zweite neubearbeitete Auflage. Berlin, 1888. R. Gärtner's Verlag, H. Heyfelder.

Pharmaceutical Chemistry. Second edition, rewritten. 8vo. 2vol. pp, 632 and 667.

Nine years ago (*American Journal of Pharmacy*, 1879, p, 158) we announced the publication of this work, of which the second edition is now before us, thoroughly revised and rearranged.

The first volume contains the elements and inorganic compounds, which are of pharmaceutical importance or interest, commencing with the non-metallic elements, and these are followed by the metals, water, bases and peroxides, acids and acid anhydrides, and the saline compounds of ammonium and the different metals, including the officinal acetates, valerates, lactates, tartrates and citrates.

The second volume is devoted to the carbon compounds which are divided into non-aromatic and aromatic compounds, the former including carbon disulphide, cyanogen compounds, derivatives of methane, alcohols and derivatives, non-aromatic acids, fats, soaps, waxes, lanolin, carbohydrates and glucosides. The second portion treats of the derivatives of benzol, naphthalin and anthracene, volatile oils, resins, caoutchouc and guttapercha, vegetable alkaloids and artificially prepared alkaloids, like pyridine, thalline and antipyrine.

The clear and precise but comprehensive manner in which the different subjects are treated, and the numerous statements, based upon the results of personal observations and researches, render the work a most valuable one for the pharmaceutical student and for the pharmacist, covering as it does completely the pharmaceutical field of these preparations, in relation to origin, preparations, properties, reactions, tests of identity and purity, etc. It is intended for the study, not of general chemistry, but of chemistry in its application to pharmacy, and therefore, presupposes a knowledge of the general principles of the science; to such students it will be a reliable guide, inciting to habits of observation and investigation.

A very valuable and interesting feature is found in the historical notes which are appended to each article, and in the appendix containing brief biographical notices of the authors, whose names have been mentioned in the body of the work in connection with the various medicinal compounds.

We are glad to learn that Professor F. B. Power is engaged in preparing an edition of this valuable work in the English language, embracing also the chemical compounds of the British and United States pharmacopœias, so that before long it may also be consulted by those not conversant with the German idiom.

Manual of Pharmacy and Pharmaceutical Chemistry, designed especially for the use of the pharmaceutical student and for pharmacists in general. By Chas. F. Heebner, Ph. G., instructor in Theory and Practice of Pharmacy at the College of Pharmacy of the City of New York. Published by the author. 12mo., pp. 213.

This useful book is divided into three parts, the first of which is devoted to apparatus and processes, the former being briefly described, and the latter concisely explained, as well as can be expected from the limited space—about forty-six pages—allotted to it. This part concludes with two lists of alphabetically arranged classes—liquid and solid—of pharmaceutical preparations, each class being defined and the number mentioned of such as have been admitted into the pharmacopœia, but without naming them or classifying them according to the officinal processes, menstrua or proportions, their composition being considered under the head of the more important constituent in one of the subsequent parts.

Though part II is designated as “inorganic pharmacy,” quite a number of organic compounds are admitted in this place, such as the acetates, tartrates, citrates, cyanides, iodoform, &c. A brief chapter on water opens this part, and then follow the mineral acids, including acetic acid, alkalies, alkaline earths and earths, halogens and their salts, including iodoform, and finally the remaining non-metallic and metallic elements and their compounds.

Part III contains “organic pharmacy,” commencing with cellulose and the derivatives by destructive distillation. Then follow starches and sugars, includ-

ing honey and as a product that may be obtained simultaneously, wax. Various exudations of plants are next considered, products of fermentation and derivatives, volatile oils, fixed oils and derivatives, alkaloids, glucosides, organic acids (gallic, tannic and valerianic acids; the others are considered in connection with other subjects), and animal drugs. The whole concludes with a brief chapter on poisons and their antidotes.

The general arrangement of the work is convenient, and the notes under each head are intentionally brief, but are sufficient for recalling to mind the important practical and theoretical points connected with each subject. The use of different types for headings and sub-headings facilitates the use of the book; in some cases the difference might advantageously be still greater and more striking. The briefness of the statements resulted in some cases to the detriment of clearness. On page 34, the herb or *flowering tops* is said to mean the *whole* plant; and the term berries appears to be used as a synonym for fruit. On page 190 menthol is stated to be found in *all* plants of the mint family. On page 168 gum resins are said to be *soluble* in diluted alcohol. That some of the magnesium minerals are green is correct; but the statement on page 94 might be taken to mean that all were of that color.

The book is valuable as a note book to pharmaceutical students, and as a brief outline of the scope embracing theoretical and practical pharmacy. Students will find it useful and as a rule reliable, and since it may be procured interleaved with writing paper, facilities are afforded for the copious addition of notes, if deemed desirable.

Proceedings of the National Wholesale Druggists' Association in Convention at Boston, August, 23d, 24th, 25th, 1887. Minneapolis. 8vo, pp. 225.

A handsomely printed volume containing the stenographically reported proceedings of this national body, which will hold its next meeting at Saratoga. President for the current year is E. Waldo Cutler of Boston; treasurer, S. M. Strong, Cleveland, and secretary, A. B. Merriam, Minneapolis.

Fourth Biennial Report of the Commissioners of Iowa (December, 1887). Printed by order of the General Assembly. Des Moines. 8vo, pp. 106.

The pamphlet contains a full synopsis of the minutes for the last two years ending August 15th, 1887, regulations, notices, correspondence, &c., and an alphabetical list of the registered pharmacists in the State of Iowa.

Beitrag zur Kenntniss des Myoconins. Von Franz Einberg. Dorpat, 1887. pp. 18.
Contributions to the knowledge of Myoconine.

The alkaloid was obtained from the rhizome and root of *Aconitum Lycocotonum*: its composition is $C_{40}H_{56}N_2O_{12}$. On treatment with soda solution it yields $C_{24}H_{38}NO_6$, a crystallizable alkaloid, identical with Hübbschmann's lycocotonine. The investigation of a second alkaloid in the same plant is not yet completed.

Des Violariées; étude spéciale du genre Viola. Par Henri Fortune. Montpellier, 1887. 8vo, pp. 96.

On the Violaceæ; special study of the genus *Viola*.

This thesis treats of the general and especially interesting characters of the

violaceæ; of the characters of the genus, the probable causes of the variation of the different species, the comparative anatomy of seventy species (several of North American origin), and of the medical and pharmaceutical uses of certain violets. Two lithographic plates of well-executed microscopical drawings illustrated the researches into the anatomy of these plants.

Loco weed; Astragalus molissimus. By L. E. Sayre, Ph. G. Pp. 6.

Reprint from Transactions of the Kansas Academy of Science, vol. x.

Professor Sayre has undertaken the investigation of the loco weeds of Kansas; the pamphlet before us is a preliminary report on one of these plants, which appears to not contain any alkaloid. The researches on the nature of the poisonous principle are continued.

Transactions of the American Dermatological Association at the eleventh annual meeting, held at the hall of the Maryland State Medical and Chirurgical Faculty in Baltimore on the 31st of August, and 1st of September 1887

The official report of the proceedings by the secretary, Dr. G. H. Tilden, Boston.

Octonary numeration and its application to a system of weights and measures. By Alfred B. Taylor, A. M., Ph. M. 8vo. pp. 73.

This essay was read before the American Philosophical Society, at Philadelphia, October 21st, 1887.

The galvano-cautery sound and its application, especially in hypertrophy of the prostate. etc. By Rob. Newman, M. D., of New York.

Read before the ninth International Medical Congress, and reprinted from the New England Medical Monthly.

Central Experiment Farm, Department of Agriculture, Ottawa, Canada. Bulletin No. 2, December 15th, 1887.

This report by Professor Wm. Saunders is largely devoted to experiments made on the vitality of commercial seeds.

Report of the Committee on indexing chemical literature.

Reprint from the Proceedings of the American Association for the Advancement of Science. vol. xxxvi.

OBITUARY.

Wm. Biddle, son of John and Elizabeth Canby Biddle, was born in Philadelphia May 17, 1806. He was fifth in descent from William Biddle of London, who came to West Jersey A. D. 1680, and from whom is descended the family of Biddles so favorably known in Philadelphia. Owen Biddle, the grandfather of the late William Biddle, took an active part in the war of the Revolution,

holding among other colonial offices that of a commissary in the army. Educated in Friends' schools from his early years, William Biddle has been identified with the educational and benevolent institutions of this city.

In 1829 he opened the drug store at the corner of 11th and Arch streets, and was very fearful lest he had made a mistake in going too far into the suburbs. He was elected a member of the Philadelphia College of Pharmacy Sept. 19, 1826.

Associated with his son, John William, he continued till 1857, when he retired and devoted his whole time to the Mine Hill and Schuylkill Haven Railroad Company, of which he was chosen secretary, and later, in 1883, was appointed president. In 1834, and for many years following, he was a director and afterward a controller of the public schools. For more than forty years he was a manager of the Magdalen Asylum. In 1840 he was chosen a director of Girard College, and as a member of the Committee of Instruction and Household, had largely to do with the first organization of the College, which was opened for scholars January 1st, 1847. In 1849 he was elected a manager of the Pennsylvania Hospital, a post which he continued to hold for a period of nearly thirty-eight years, the last fourteen of which he was chosen president of the Board.

Although his health had been failing for several months, his last illness was very short, and he died at his residence in Germantown on the 7th day of June, 1887, in the 82nd year of his age.

Blessed with a cheerful disposition and with a heart overflowing with benevolence, it was his delight to assist by a kind word or timely advice those who might be in need of it, and much of his time was devoted to labors in connection with institutions for the alleviation of the sufferings of his fellow beings.

Dr. Camille Jean Marie Mehu died in Paris, France, November 29th, at the age of 52 years. He was born and educated at Dijon, in 1838 became assistant pharmacist in the central pharmacy of the civil hospitals, subsequently was in a similar capacity at the Midi Hospital, and in 1862 received the appointment of Chief Apothecary in the Necker Hospital. In 1865 he graduated in medicine, and in 1880 was elected a member of the Academy of Medicine in the section of pharmacy, and President of the Pharmaceutical Society of Paris. He was the author of numerous essays on pharmaceutical and chemical subjects, a number of which will be found in previous volumes of this JOURNAL. Of late years his investigations were especially directed towards pathological subjects, for which his position as chief apothecary of the Charity Hospital afforded ample material. He translated Sutton's "Volumetric Analysis" into French, and was for many years one of the editors of the *Journal de Pharmacie et de Chimie*. At the Fourth International Pharmaceutical Congress, held in St. Petersburg, in 1874, Dr. Méhu was one of the Secretaries, and as the representative of the Paris Society of Pharmacy submitted the draft of a Universal Pharmacopœia, elaborated by that society. At the fifth congress held in London in 1881 he was appointed a member of the International Pharmacopœia Commission, and he participated also actively in the deliberations of the sixth congress held at Brussels in 1885.

Dr. Mehu's labors for the elevation of pharmacy secured for him not only the esteem of the pharmacists of France, but his merits were deservedly recognized abroad, and many foreign societies honored him by electing him to membership; among others the Philadelphia College of Pharmacy had made him

a Corresponding Member, and only a few months since, the Pharmaceutical Society of Great Britain had elected him an Honorary Member.

Dr. Theodor Rieckher died in Marbach, Germany, January 17th, at the age of seventy years. He was born and educated in Stuttgart, and after finishing his apprenticeship studied natural sciences and devoted himself particularly to chemistry. Subsequently he became proprietor of the pharmacy in Marbach, and continued in active business until a few years ago. His practical observations and researches, which were mostly published in the *Neues Jahrbuch für Pharmacie*, are of lasting value and attracted much attention; a number of them have been translated for this Journal. Fumaric, valeric and angelic acids, rectification of sulphuric acid, phosphoric acid, estimation of nitric acid, ferric oxide, mercurous iodide, salts of bismuth and silver, purification of potassa, Schlippe's salt, distinction of antimony and arsenic, anhydrous alcohol, amyl alcohol, tests for chloral and strychnia, are some of the subjects which claimed his attention, besides many of the galenical preparations. For a prolonged period he was presiding director of the South-German Apothecaries Society. He took an active part in the organization of the First International Pharmaceutical Congress, held in Braunschweig, Germany, 1865, and at the second Congress held in Paris, France, in 1867, was on the first ballot elected President, the late Prof. William Procter being First Vice President.

Dr. Rieckher was a pharmacist of broad views, and a devoted disciple of science in its application to pharmacy. In him the Philadelphia College of Pharmacy has lost one of its corresponding members.

Professor Heinrich Anton De Bary, the celebrated botanist, died in Strassburg, January 19th, at the age of fifty-seven years. He was born in Frankfort-on-the-Main, January 26th, 1831, and received his preliminary education in his native city, studying afterwards at the Universities of Heidelberg, Marburg and Berlin, where he graduated in medicine in 1853. At first he intended to practice medicine in Frankfort, where his father was a physician, but in 1854 he located at Tübingen as Lecturer on Botany, and in 1855 accepted a call to the University of Freiburg where in 1859 he became Professor ordinary of Botany. In 1867 he occupied the same chair in Halle, and in 1872 went to the newly created University at Strassburg, becoming its first rector. Already in 1858 he published researches on the smuts (ustilagineæ) and the diseases caused by them in plants, particularly in grain and other useful plants. This work indicated the domain of science to which his life was mostly devoted, namely, the cryptogams, and among them, more particularly the fungi. The lowest forms of vegetable life were necessarily drawn within the scope of his observations; in 1885 appeared his important work on the "Comparative Morphology and Biology of Fungi, Mycetozoa and Bacteria." One of his best known works is on the "Comparative Anatomy of the Vegetative Organs of the Phanerogams and Ferns," published in 1877 as the third volume of "Hofmeister's Physiological Botany" projected in 1861. Since 1866 De Bary was editor of the *Botanische Zeitung* which periodical contains numerous contributions from him and from his pupils. The deceased was associated with many scientific societies in honorary membership, for a few months also with the Pharmaceutical Society of Great Britain.

Professor Asa Gray, who died at Cambridge, Mass., January 30th, was born in Paris, Oneida County, New York, November 18th, 1810; educated at the Clin-

ton Grammar School, and graduated from the medical college at Fairfield as M. D. in 1831. He then taught natural history in Utica, and soon afterwards made the acquaintance of the late Dr. John Torrey, who exerted a marked influence upon the young scientist's career. As the curator of the Lyceum of Natural History of New York city, Dr. Gray devoted much of his time to the study of the flora of the surrounding country, and in 1836 published his "Elements of Botany," the first of a series of elementary works, which have been largely instrumental in fostering the study of botany throughout the United States, and which in more recent editions, are still extensively employed as elementary text-books. An appointment as botanist to the United States exploring expedition under Captain Charles Wilkes was accepted by Gray, but owing to the delay by the government with the necessary preparations for the protracted journey, Gray resigned the position in 1837, before the expedition sailed, and together with Torrey commenced in 1838 the publication of the "Synoptical Flora of the United States," which soon afterward was suspended owing to the rapid accumulation of new material, but from 1878 to 1884 was continued with the efficient aid of Prof. Sereno Watson, after Prof. Torrey's death in 1873.

In 1838-39 Gray visited Europe, and made the acquaintance of the most eminent botanists of Great Britain and the European continent, and had occasion to examine the botanical treasures collected together in those countries. In 1843 he accepted the Fisher Professorship in Harvard College, which position he held to his death, though since 1873 the active duties have devolved upon Professors Goodale and Farlow, while Gray devoted his time to the elaboration of the flora of North America. His extensive herbarium and valuable library remain—in a fire-proof building—at the scene of his principal labors.

Aside from his elementary works on botany designed for the use of amateurs and for schools, Gray's "Structural and Systematic Botany" has been of most decided influence in North America upon the study of botany as a science. The sixth edition has grown into four volumes, of which the first on "Organography," appeared in 1880, and the second on "Physiological Botany," by Professor Goodale, in 1885. The third volume on "Cryptogamous Botany," is being prepared by Professor Farlow, and the fourth volume, "Systematic Botany of Phanogamous Plants," has been, in part at least, prepared by Gray.

His "Manual of the Botany of the Northern United States" made its first appearance in 1848, and the fifth edition in 1867; it is still the standard work for the region indicated on its title page.

Gray's contributions to botanical science are exceedingly numerous, and are "distributed through many "Reports" (like the "Botany of California") and periodicals; among the latter should particularly be mentioned the American Journal of Science and Arts, and the Proceedings of the American Academy of Arts and Sciences. His critical papers on Darwin's observations were, in 1876, collected together in a volume bearing the title "Darwiniana."

Professor Gray's eminence as a scientist has been recognized at home and abroad. Honorary degrees have been conferred upon him by various educational institutions, and most of the prominent learned societies abroad elected him a member. For many years his name graced the list of honorary members of the Philadelphia College of Pharmacy.

Dr. Joseph Roberts, who died in Baltimore January 31st, was born in the same city February 15th, 1824, of parents descended from Welsh and German stock. He was educated at the West Nottingham Academy, and in 1841 entered as an apprentice in the store of the late John Milhau in New York, graduating from the College of Pharmacy in that city in 1845. In the following year he opened a drug store on Greenmount avenue, in Baltimore, where he continued in active business to the time of his death. He soon became identified with the Maryland College of Pharmacy, and when that institution was re-organized in February, 1856, on the basis of the charter granted by the Legislature, January 27th, 1841, Mr. Roberts was elected one of the examiners, the other two members of this first board being J. Faris Moore and Alpheus P. Sharp, the latter alone surviving. In this capacity as well as a member of the Board of Trustees, as Treasurer, and for over ten years as President of the College, Dr. Roberts rendered valuable services, and during the past two years he labored assiduously for the institution as chairman of the Finance Committee, having in charge the erection and management of the new college building. In 1856 he joined the American Pharmaceutical Association, and was elected vice-president in 1859, and president in 1885. When serving on committees his counsel was sought by his associates, and highly appreciated for its wisdom and prudence. In the meetings he preferred to be a listener to the debates, but when he conceived the proper moment to have arrived he expressed his views with energy and frankness. While of a conservative disposition, he not only kept fully abreast of the progress of science, but he likewise sought to secure for pharmacy the benefits arising from healthy and substantial progress.

Of late years Dr. Roberts spent a portion of his time as an associate member of the firm of Geo. R. Page & Co. at the work-shops for portable engines and agricultural implements; and his fondness for country life induced him to secure a farm on Back River Neck, which he was in the habit of visiting weekly. On the occasion of such a visit, on January 24th last, he contracted a severe cold, which developed into pneumonia, and after confinement to bed for two or three days, terminated his life. Since 1861 he had been married to Miss Carrie Hutton of West Virginia, who with one son survives him.

In person Dr. Roberts was of large and portly build and of commanding presence. Though somewhat difficult of approach, he was a firm and true friend and valued pure friendship towards his associates, but scorned pretentiousness. His fellow citizens elected him twice to the City Council—a deserved compliment to his manly virtues.

Dr. Jacob Faris Moore, Professor of Materia Medica at the Maryland College of Pharmacy, died in Baltimore, February 3d, at the age of 62 years. The deceased was born in Port Penn, New Castle Co., Del., February 20th, 1826, and was educated at Elkton. In 1842 he became an apprentice in the pharmacy of the late George W. Andrews, remaining with him for six years, and graduating from the Maryland College of Pharmacy in 1847. Subsequently he was in business for three years in Wilmington, Del., and graduated in medicine from the Jefferson Medical College, Philadelphia, in 1849. He then returned to Baltimore and opened the drug store at the corner of Howard and Madison streets, until 1858 in partnership with J. K. B. Emory. On the reorganization of the Maryland College of Pharmacy in 1856, Dr. Moore was one of its incorporators and was elected a member of the Board of Examiners; from 1872 to 1875 he

held the position of president; in 1861 he was elected Professor of Pharmacy, and in 1879 was transferred to the chair of Materia Medica and Botany. He was a member of the committee for the revision of the Pharmacopœia in 1870. At the meeting of the American Pharmaceutical Association, held at Baltimore in 1856, Dr. Moore became a member, and in 1862 was elected vice-president, and in 1863 president, and in 1869 local secretary for the meeting of the year following; he also served several times on important committees, and when present at the meetings participated in the discussions expressing his views with candor and vigor. To the AMERICAN JOURNAL OF PHARMACY he contributed several papers on practical pharmaceutical topics.

Dr. Moore took an active part in public affairs, and for two years was a prominent member of the City Council of Baltimore.

While attending religious services he was stricken with congestion of the brain, expiring within forty-eight hours afterwards. He leaves one son, Clarence Faris Moore; his wife died in 1866, and two of their children since.

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P. wd. Ext. Columbo....."	50	Powd. Ext. Rhatany....."	45
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PUBLISHED BY AUTHORITY OF THE

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Under the supervision of the Publishing Committee, consisting of

HENRY N. BITTENHOUSE, JAMES T. SHINN, CHARLES BULLOOK, T. S. WIEGAND,

AND THE EDITOR

JOHN M. MAISCH.

Price, \$3.00 per Annum, }
in advance.{ Issued in Monthly numbers of
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30 cts.

APRIL, 1888.

Vol. XVIII., No. 4

CONTENTS.

Analysis of the Volatile Oil of Hedeoma	Patchouli Oil and Leaves	184
Pulegioides (Persoon). By Frederick	The Origin of Petroleum. By Albert H.	
Wm. Franz, Ph.G.	Samuel, F.C.S.	187
161	Crystallized Mercurous Iodide and Bro-	
Apocynum Cannabium. By Henry A. C.	midide. By A. Stroman	197
Poppenhusen, Ph.G.	Combination of Silver Chloride with Metal-	
168	lic Chlorides. By M. C. Lea	198
Moss Mucilages as Emulsifiers. By Albert	On Coca. By Dr. H. H. Rusby	199
John Standt, Ph.G.	Minute of the College Meeting	202
170	Minutes of the Pharmaceutical Meeting	203
On Bland's Pills. By Jos. W. England,	Pharmaceutical Colleges and Associations.	204
Ph.G.	Editorial	220
173	Proceedings of the State Pharmaceutical	
Liquor Hydrargyri Chloridi Corrosivi. By	Associations	222
E. H. Naudain, Ph.G.	Reviews and Bibliographical Notices	222
174	Obituary	242
Specific Gravity. By A. B. Taylor, Ph.M.		
175		
Gleanings from the German Journals. By		
John A. Martin, Ph.G.		
178		
Abstracts from the French Journals.		
178		
Note on Sandalwood Oil. By Peter MacEw-		
an		
182		

NOTICE TO READERS.

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Address all papers for publication, etc., to the Editor JOHN M. MAISCH.

All communications relating to subscriptions, advertisements, etc., to the Business Editor, H. H. WOLLE, 143 North Tenth Street, Philadelphia, Pa.

The Botanical Class will be organized at the College Building at 4 P. M. on Wednesday, April 18. Graduates and Matriculants of the College are invited.

Meetings of State Pharmaceutical Associations.

STATE.	TIME.	PLACE.	LOCAL SECRETARY.
Alabama.....	May 8th.....	Selma.....	G. A. Cunningham.
Delaware.....	May 31.....	Wilmington.....	J. M. Harvey.
Florida.....	May 8th.....	Tallahassee.....	J. A. Conover, Jacksonville.
Indiana.....	June 6th.....	Fort Wayne.....	J. R. Perry, Indianapolis.
Iowa.....	May 24.....	Des Moines.....	Norman Lichty.
Kansas.....	May 17th.....	Abilene.....	E. E. Lewis.
Kentucky.....	May 9th.....	Henderson.....	E. Y. Johnson, Louisville.
Louisiana.....	April 11th.....	New Orleans.....	Mrs. K. Rudolf.
Massachusetts.....	June 5th.....	Boston.....	
Minnesota.....	June 12th.....	Stillwater.....	J. C. Hearing.
Mississippi.....	May 15th.....	Meridian.....	H. F. West, Fayette.
Missouri.....	June 19th.....	Sweet Springs.....	J. D. Eads, Warrensburgh.
Nebraska.....	May 8th.....	Lincoln.....	W. C. Lane.
New Jersey.....	May 16th.....	Morristown.....	H. M. Smith.
New York.....	June 19th.....	Catskill.....	G. A. Dykeman.
Ohio.....	June 12th.....	Columbus.....	H. C. Cook.
Pennsylvania.....	June 12th.....	Titusville.....	C. W. Lippincott.
Tennessee.....	May 9th.....	Chattanooga.....	
Texas.....	June 12th.....	Austin.....	F. D. Oesch, Fort Worth.
Virginia.....	May 8th.....	Danville.....	F. Clark.
West Virginia.....	June 19th.....	Clarksburg.....	C. Meakemeller, Wheeling.

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The Seventh Pharmaceutical Meeting of the series will be held in the Museum of the College of Pharmacy, Tuesday, April 17th, at 3 30 P. M. All interested in pharmacy and allied sciences are invited to attend and bring forward any matters of interest to the profession.

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THE AMERICAN JOURNAL OF PHARMACY.

APRIL, 1888.

ANALYSIS OF THE VOLATILE OIL OF HEDEOMA PULEGIoidES, (PERSOON.)

By FREDERICK WM. FRANZ, PH.G.

[From an Inaugural Essay.]

But very little information, regarding the chemical composition of this oil, was published, until the recent contribution to the American Pharmaceutical Association, by Ed. Kremers; and nearly all of the following chemical results were obtained before the appearance of his paper.

Description.—A yellowish liquid, slightly turbid, of a pungent, mint-like odor and taste, soluble in all proportions of alcohol, and having a faint acid reaction, which might easily be overlooked. Specific gravity of the dried oil at 15°C., 0.931; boiling from 180°–206°C.

Reactions of the dried oil.—No greasy stain was left on paper, showing the absence of fixed oil. It gave no reactions with solution of ferric chloride, alcoholic solution of ammonium sulphide, nor with saturated solution of sodium bisulphite, indicating the absence of phenols or aldehyde-like bodies; and nothing crystallized out when subjected, for three hours, to a temperature of -17°C .

Fractional distillations.—About 900 grams were subjected to distillation. The first portion was found to have a strong acid reaction, this fraction was therefore not taken until all of the acid had been distilled over. This was then shaken with water, and separated, until all of the acid had been dissolved out; this acid solution was marked X and set aside for further investigation. The oil was then thor-

oughly dried, mixed with the remainder, and subjected to repeated fractional distillation, until the following fractions were obtained:

Fraction.	Boiling.	Quantity.	Fraction.	Boiling.	Quantity.
I.	below 165°C.	2c.c.	VII.	215°-217°C.	50c.c.
II.	165°-170°	6 "	VIII.	217°-218°	300 "
III.	170°-180°	20 "	IX.	218°-220°	125 "
IV.	180°-185°	25 "	X.	220°-222°	85 "
V.	185°-200°	50 "	XI.	222°-225°	25 "
VI.	200°-215°	160 "	XII.	225°—	50 "

After removing the fifth fraction the neck of the flask broke, and on examination the next morning was found to be studded with small, fine, needle-shaped crystals; it was accordingly marked Z, and set aside for further investigation. These fractions were all placed in a freezing-mixture of $-17^{\circ}\text{C}.$ for two and a half hours, but nothing separated. Fraction xii was fluorescent and became solid though not crystalline.

ULTIMATE ANALYSIS.

FRACTION II. (165° - $170^{\circ}\text{C}.$)—In the first 0.1375 grams, and in the second 0.1412 grams of oil were used, with the following results: The formula corresponding most nearly is $\text{C}_6\text{H}_{12}\text{O}$.

Found.			Calculated for $\text{C}_6\text{H}_{12}\text{O}$.
I.	II.	Average.	
C. 72.098 per cent.	72.115 per cent.	72.106 per cent.	72.00 per cent.
H. 12.288 "	12.039 "	12.164 "	12.00 "
O. 15.614 "	15.846 "	15.730 "	16.00 "
100.000 per cent.	100.000 per cent.	100.000 per cent.	100.00 per cent.

FRACTIONS X AND XI. (220° - 225°)—In the first 0.1414 grams, and in the second 0.1678 grams of oil were used. The liquids were then mixed, refractionated, and an analysis made of the fraction obtained between 220° and 225° , and marked T, of which 0.144 grams of oil were used. The formula corresponding most nearly to these results is $\text{C}_{10}\text{H}_{17}\text{O}$.

Found.			Calculated for $\text{C}_{10}\text{H}_{17}\text{O}$.
X.	XI.	T.	
C. 78.40 per cent.	78.34 per cent.	78.503 per cent.	78.43 per cent.
H. 11.19 "	11.22 "	11.189 "	11.12 "
O. 10.41 "	10.44 "	10.308 "	10.45 "
100.00 per cent.	100.00 per cent.	100.000 per cent.	100.00 per cent.

FRACTION VIII. (217°-218°)—Specific gravity at 16°C. 0.928. In the first analysis 0.1372 grams of oil, and in the second 0.1416 grams of oil were used with the following results, the formula corresponding most nearly to these being $C_{10}H_{18}O$.

Found.			Calculated for $C_{10}H_{18}O$.
I.	II.	Average.	
C. 78.21 per cent.	78.00 per cent.	78.105 per cent.	77.922 per cent.
H. 11.62 "	11.69 "	11.655 "	11.688 "
O. 10.17 "	10.31 "	10.240 "	10.390 "
100.00 per cent.	100.00 per cent.	100.000 per cent.	100.000 per cent.

VAPOR-DENSITIES.—These were determined by V. and C. Meyer's method. See "Berichte der deutschen chemischen Gesellschaft," 1877, page 2253. Paraffin was used as the bath and heated to from 10°-20°C. above the boiling point of the oil. The density of the vapor is calculated by the formula :

$$\frac{S. 760 (1 + 0.003665 t)}{(B-W) V. 0.001293.} \quad \text{or} \quad \frac{S. (1 + 0.003665 t) 587780.}{(B-W) V.}$$

This gives the density in comparison with air, and then by multiplying by 14.45 we get the vapor-density compared with hydrogen, which equals one-half the molecular weight.

S denotes the amount of oil. T is the temperature of the water. B is the barometric pressure reduced to 0°C. W is the tension of aqueous vapor, and V is the volume of air displaced. 0.003665 is the coefficient of the thermal expansion of gases. 0.001293 is the weight of a cubic-centimetre of air at 0°C. and 760 m.m. pressure. 587780 is a figure obtained by dividing 760 by 0.001293.

Fraction VIII. (217°-218°).—First determination: 0.0467 gms. of oil were used at 759 m.m. pressure and 20° C.; 7.5 c.c. of air were displaced, the temperature of the water being 14° C., which gives a vapor-density of 75.24+.

Second determination: 0.074 gms. of oil were used at 759 m.m. pressure, and 20° C.; 8.8 c.c. of air were displaced, the temperature of the water being 16° C., which gives a vapor-density of 79.37. The average of these two determinations is 77.31. The average percentage composition obtained by ultimate analysis is C 78.105%; H 11.655%; O 10.240%, and the formula corresponding most nearly is $C_{10}H_{18}O$.

Half the molecular weight of $C_{10}H_{15}O$ is 77.00.

Half the molecular weight obtained by

calculation from the vapor-density is 77.30.

Fraction T. (220°–225°).—First determination: 0.0406 gms. of oil were used at 767 m.m. pressure, and 21° C.; 6.5 c.c. of air were displaced, the temperature of the water being 22° C., which gives a vapor-density of 76.88.

Second determination: 0.0499 gms. of oil were used at 767 m.m. pressure, and 22° C.; 8.2 c.c. of air were displaced, the temperature of the water being 22° C., which gives a vapor-density of 75.05+.

The average of these two determinations is 75.97+. The percentage composition obtained by ultimate analysis is C 78.503%; H 11.189%; O 10.308%, and the formula corresponding most nearly to this is $C_{10}H_{17}O$.

Half the molecular weight of $C_{10}H_{17}O$ is 76.50.

Half the molecular weight obtained by

calculation from the vapor-density is 75.97.

Fraction II. (165°–170°).—0.0487 gms. of oil were used at 759.5 m.m. pressure, and 25° C.; 12.2 c.c. of air were displaced, the temperature of the water being 23° C. This gives a vapor-density of 50.18+.

The average percentage composition obtained by ultimate analysis is C 72.106%; H 12.164%, and O 15.730%. The formula corresponding most nearly to this is $C_6H_{12}O$.

Half the molecular weight of $C_6H_{12}O$ is 50.00.

Half the molecular weight obtained by

calculation from the vapor-density is 50.18.

Polarization. The rotatory power was determined by a Wild polaristrobometer or shadow polarimeter; both the 100 and 200 millimeter tubes were used, but as the former only serves to determine whether the substance is dextrogyre or lævogyre, only the figures obtained with the latter are given.

Original oil boiling from	180°–206°C	+46.0
Fraction T.	220°–225°	+45.6
“ IX	218°–220°C	+44.6
“ VIII.	217°–218°	+43.6
“ VI.	200°–215°	—11.0
“ V.	185°–200°	—20.0
“ IV.	180°–185°	—25.9

Analysis of the Acids.—About 150 grams of the original oil were repeatedly shaken with water, until the separated water had a neutral reaction, this was marked X¹, and set aside for further examination. The oil was then shaken with lime-water to take out any remaining acid, until after filtering, the oil had a neutral reaction. A portion of it was placed in a flask connected with an upright condenser, the top of which was connected with a piece of glass tubing so that the end dipped beneath the surface of water, contained in a test-tube, so as to absorb any volatile substance which might possibly not have been condensed. After taking this precaution the oil was actively boiled for three hours. The water in the test-tube was then tested and found to be neutral. Water was next poured into the condenser, to wash down any remaining substance into the flask containing the oil, and the flask was well shaken; the oil and water separated, both giving neutral reactions with test paper.

The remaining portion of the oil was distilled; all of the distillates obtained at different temperatures, gave a neutral reaction, when tested with test paper, thus showing that no acid is liberated by the decomposition of a compound ether in the oil, on boiling or distilling, but that all of the acid present is in a free state.

Portion X.—This acid solution was treated with barium carbonate in excess, filtered and evaporated over sulphuric acid; a sticky mass and only a few crystals were obtained. This was dissolved in water, filtered from the excess of barium carbonate, and the filtrate evaporated to dryness on a water-bath, when a large quantity of crystals was obtained which were again dissolved in water; on evaporating the solution over sulphuric acid again a sticky mass was left. This was dissolved and gave the following reactions:

I. With solution of ferric chloride a bright-red color was produced, which, on heating, gave a slight precipitate.

II. With solution of silver nitrate a white precipitate, which, on slightly heating, was soon reduced.

III. With solution of mercuric chloride a white precipitate, reduced, when heated for some time.

IV. When heated gently with sulphuric acid and alcohol, an odor resembling formic ether was produced.

These all seem to show the presence of a formate, especially reactions III. and IV. Reactions I. and II. may have been partly caused by an acetate, as will be seen by the following experiments:

V. To a small quantity of the barium solution very dilute sulphuric acid was added as long as a precipitate was produced, filtered, distilled and treated with magnesium oxide (See method of Dr. A. Meyer, *Chemische Analyse*, page 55), which on evaporation remained somewhat sticky while warm.

VI. 0.216 gms. of the barium salt were dissolved in water; very dilute sulphuric acid was added as long as a precipitate formed; the liquid was filtered, the precipitate dried and weighed, giving 0.220 gms. of barium sulphate. The percentage of barium present was calculated as follows: $232.8 : 136.8 :: 220 : 1292$;

Then $.216 : .1292 :: 100 : 59.85$.

Calculated :

$\text{Ba}(\text{C}_2\text{H}_3\text{O}_2)_2$.	$\text{Ba}(\text{CHO}_2)_2$.	Found.
Ba=53.68 %.	Ba=60.52 %.	Ba=59.85 %.

VII. The acid set free in the foregoing reaction was treated with excess of freshly precipitated carbonate of lead, filtered, evaporated and treated with alcohol and filtered; only a small amount was found to have been dissolved, an aqueous solution of which gave with mercuric chloride no precipitate, but, with ferric chloride a bright-red color showing the absence of formic and the presence of acetic acid. The portion insoluble in alcohol was dissolved in water, and gave a white precipitate with solution of silver nitrate, reduced on heating. Thus it will be seen that reactions V., VI. and VII. show the presence of a small quantity of acetic acid. X¹ gave the same reactions for formic and acetic acids as X.

Crystals found in the broken flask.—The flask was first rinsed with petroleum spirit and allowed to evaporate, but no crystals were observed. The flask was then rinsed with ether, and evaporated, showing a number of small needle-shaped crystals on the side of the beaker; on heating a few of these they were found to be easily volatilized. The flask was rinsed with more ether, which was added to the crystals, to evaporate over night, with a view of obtaining a larger quantity, but unfortunately the ether drove the crystals up the sides of the beaker, into the filtering paper used as a cover, and so were lost.

Experiments with hydrochloric acid.—I. Portions of different fractions of the oil were placed in a freezing mixture and dry hydrochloric gas passed in until saturated. They at first acquired a dark color, which on standing gradually became lighter, but nothing separated out.

II. Other portions of these fractions were shaken with ether, and saturated with dry hydrochloric acid gas (See O. Wallach, in "*Annalen der Chemie*," vol. 239, 1), but with no better result.

III. Other portions were shaken with glacial acetic acid and saturated with dry hydrochloric acid gas, with the same result as before.

EXPERIMENTS WITH ZINC DUST AND METALLIC SODIUM.

Several light fractions were treated with these substances separately and distilled, with a view of obtaining a hydrocarbon if possible, but without success. The residue left in the still was a yellowish, sticky mass, showing a decomposition of oil. Two ultimate analyses were made of a fraction boiling between 180°–185°C. as follows:

In the first 0.1125 grams and in the second 0.1175 grams of oil were used.

The formula corresponding most nearly is $C_{23}H_{30}O$.

Found.			Calculated.
I.	II.	Average.	for $C_{23}H_{30}O$.
C. 83.44 per cent.	83.37 per cent.	83.405 per cent.	83.38 per cent.
H. 11.85 "	11.63 "	11.740 "	11.78 "
O. 4.71 "	5.00 "	4.855 "	4.84 "
100.00 per cent.	100.00 per cent.	100.000 per cent.	100.00 per cent.

Summary.—The results of the analysis may be summarized as follows:

I. A body of the composition of $C_{10}H_{18}O$, boiling from 217°–218°C. and constituting about 33 % of the original oil.

II. A body of the composition of $C_{10}H_{17}O$, boiling from 220°–225°C. and constituting about 12 % of the oil.

III. A body of the composition of $C_6H_{12}O$, boiling from 165°–170° and constituting about 0.7 % of the oil.

IV. Formic acid existing in a free state about 0.5 %.

V. Acetic acid also in a free state a small quantity only.

Specimens of seven different fractions and also the decomposition product, obtained on distilling the oil which had been treated with metallic sodium, are handed in with this essay.

The oil was obtained from a reliable wholesale house of this city, and known to be pure.

The investigation was conducted in the chemical laboratory of the Philadelphia College of Pharmacy, and under the supervision of Professor Henry Trimble.

Note by the Editor.—In the October number (1887) of this Journal,

page 535, will be found a synopsis of the results obtained by Mr. Kremers, whose paper has been referred to in the foregoing essay. To facilitate the comparing of the results obtained with oil of pennyroyal by the two investigators, we append the summary prepared by Mr. Kremers, according to which oil of pennyroyal was found to contain :

I. A low boiling alcohol, the products obtained from two different quantities of oil, and, according to slightly modified processes, apparently differing. The nature of this body, therefore, remains to be determined.

II. A body of the composition $C_{10}H_{18}O$, which may be designated as *hedeomol*, occurring in two modifications of different boiling points. Their derivatives and oxidation products remain to be studied.

III. Formic acid : 1. Its salt became reduced almost immediately. 2. Its barium salt reduces $HgCl_2$ to $HgCl$. 3. Its lead salt is insoluble in alcohol.

IV. Acetic acid : 1. Its iron salt is soluble in water, imparting to it a bright red color, and becomes precipitated on boiling. 2. Its silver salt is white, and does not become darkened within five minutes. 3. Its lead salt, when heated with arsenic trioxide, gives the kakodyl reaction. 4. The free acid causes the formation of white fumes with ammonia.

V. Isoheptoic acid : 1. Determined by the analysis of its salts. 2. Its barium salt is amorphous and readily soluble in water, which distinguishes it from the normal heptoic acid.

APOCYNUM CANNABINUM.

By Henry A. C. Poppenhusen, Ph. G.

From an inaugural essay.

The commercial roots are nearly cylindrical, rather long, from three sixteenths to one half inch thick, longitudinally wrinkled. The bark of the thinner ones is transversely fissured. It has but few branches. Externally it is of a brownish appearance and internally whitish, breaking with a very short fracture. When pounded in a mortar, the bark is readily reduced to a powder, but the woody portion becomes spongy and very resistant. Odor faint, but peculiar; taste very lasting and persistently bitter, the woody portion almost tasteless.

Structure.—The bark is about as thick as the wood, consisting of an outer thin layer of cork and an inner fleshy layer made up of parenchyma, which contains laticiferous ducts and small patches of resin. The cells of parenchyma are filled with starch.

The central portion consists of a small central pith, of wood-wedges which are very narrow, and separated by delicate medullary rays, and of ducts, forming concentric circles.

A longitudinal section shows the ducts to be scalariform in appearance when enlarged about ninety diameters. They are then very plain and are of a beautiful appearance. (See also AMERICAN JOURNAL OF PHARMACY, 1881, p. 510 and 551.

Portions of the upper stem were found attached to some of the roots, of which sections were made and examined. The greater portion consists of woody tissue enclosing a large central pith. The bark consists chiefly of bast tissue, which is very fibrous.

Analysis.—The roots for analytical examination were reduced to a very fine powder (No. 100). Only a qualitative examination was made; which was carried out after the directions in "Dragendorff's Plant Analysis."

Three grams of the powdered root were heated upon a water bath for several hours, for determining the moisture, which equaled to .285 gram, or 9.5 per cent. This dry drug was then subjected to a high heat with the addition of a small quantity of nitrate of ammonium after carbonization for completing incineration. The total amount of ash equaled .35 gram or 11.6 per cent.; it contained iron in traces, aluminium and potassium, combined with sulphuric and hydrochloric acids.

Ten grams were treated in succession with the different solvents in a graduated bottle by maceration, for a period of eight days, shaking the bottle frequently. The extract obtained by treatment with petroleum benzin was found to contain wax, fat and some resin. The ether extract yielded about two-thirds of its weight to absolute alcohol, and the residue was insoluble in water; the extract contained a crystallizable resin and a glucoside, the latter soluble in alcohol, and decomposed by boiling with dilute hydrochloric acid.

About twenty-eight per cent. of the extract obtained with absolute alcohol was soluble in water, and it was totally insoluble in ether; it contained tannin, glucose, a glucoside, bitter principle, etc., but no alkaloid.

The water extract of the drug contained mucilage, albuminoids, an organic acid, etc., and yielded an ash weighing nearly seven per cent. of its weight. Diluted alkali took up from the drug mucilage, albuminoids, phlobaphene and other principles; and in the extract made with dilute acid parabin was found, but no calcium oxalate.

Starch, resin and mucilage were also recognized microchemically in the drug.

A portion of the drug was carefully separated into wood and bark; the latter weighed 62.25 per cent. of the weight of the drug, and yielded notably larger amounts of extract than the entire root, with both ether and alcohol.

MOSS MUCILAGES AS EMULSIFIERS.

By Albert John Staudt, Ph. G.

From an inaugural essay.

The new National Formulary, which is in course of preparation under the direction of the National Formulary Committee, appointed by the American Pharmaceutical Association, having adopted as emulsifier for fixed oils the mucilage obtained from Irish moss, a species of algae, which yields a mucilaginous jelly with water, it was thought not inappropriate to investigate the subject of so called moss mucilages and determine their value for the dispensing pharmacist as a substitute for the well known gum acacia. This mucilage is present in certain thallophytes, like the officinal *Chondrus* or Irish moss, and *Cetraria* or Iceland moss.

The last recorded examination of Irish moss was made by Church in 1877, who found its composition to be as follows: Mucilage, 55.4; water, 18.8; mineral matter, 14.2; albuminoids, 9.4; and cellulose, 2.2. As may be seen the principal constituent is mucilage, which may be obtained by boiling the drug with water, straining and allowing to cool. Although the mucilage thus formed, in comparison with other mucilages, keeps fairly well, it in time, becomes mouldy on top and no longer fit for use, hence it is scarcely appropriate for the dispensing pharmacist to use except when freshly made; and to the manufacturer who could use a large quantity of the fresh mucilage it would serve admirably as an emulsifier.

Mr. Emlen Painter, of New York, thinking it would be very desirable if this mucilage could in some way be preserved, made a few

experiments to this end, the results of which he read at the last meeting of the American Pharmaceutical Association; but all attempts to preserve the mucilage being unsuccessful, the only method remaining to present the Irish moss in a form that could be kept on hand by the pharmacist was by evaporating the mucilage to dryness and forming a gelatin; and to this end I also directed my efforts. I took four ounces of good, bleached Irish moss, and first washed it well in cold water, removing admixtures and impurities, then placed it on a steam bath, with two hundred ounces of water, and by the aid of steam under pressure was able to obtain a constant and safe heat. After continuing this heat for a half hour, with frequent stirring, the mixture was transferred to a strong muslin strainer, which had previously been soaked in warm water, and although a slow process, by taking the precaution to use no pressure, but to constantly keep a clean surface on the bottom of the strainer by means of a wooden stirrer, a clear mucilaginous liquid was obtained, which, upon cooling, was found to be in the form of a jelly.

This mixture was again transferred to the steam bath and evaporated, with constant stirring, to a semi-fluid consistence, when it was spread as evenly as possible on all sides of the kettle, and the heat continued until a perfectly dry gelatin was formed. Upon cooling the kettle by passing a stream of cold water through the jacketed portion, I was able, by careful manipulation, to remove the gelatin in one entire piece, which was afterwards cut in strips suitable for use. It is thin, yellowish brown in color, light, and slightly translucent, breaking with a short fracture, but not enough so to be brought to a powder under the pestle. While it is but sparingly soluble in cold water, it dissolves completely in boiling water, and a mucilage may in this way be obtained resembling in appearance and viscosity the acacia preparation, and possessing as little taste.

Emulsions were first prepared by agitation as suggested by Mr. Painter (see AMERICAN JOURNAL OF PHARMACY, 1887, p. 535); 10 grains of Irish moss gelatin were dissolved in $1\frac{1}{2}$ ounces of boiling water, an operation taking some ten minutes time. After the mucilage had become perfectly cold, a precaution always to be observed, it was transferred to a four-ounce bottle; and 2 ounces of cod liver oil were gradually added in divided portions, shaking vigorously after each addition until a perfect emulsion was formed; $\frac{1}{2}$ ounce of syrup and three drops of oil of wintergreen were added

and lastly, enough water to make four fluid-ounces shaking the whole thoroughly together.

The emulsions thus formed seem to be practically inseparable, they having stood for over three months showing no apparent separation. Examined under the microscope the particles of oil are not so minutely or uniformly divided as in emulsions made by some other agents, or made in a mortar in the usual way.

An emulsion was also prepared according to the same formula, by mixing the mucilage of Irish moss with the oil and other ingredients in a mortar in the usual way for preparing emulsions with acacia, instead of in a bottle as before. Examined under the microscope it was found to be almost perfect, the particles of oil being very uniformly and minutely divided. But as to its standing qualities it appears to be not better than those made by simply shaking in a bottle. It is not always the most perfect emulsion as seen under the microscope, that stands the best and is the best, but those in which the oil is not so finely divided often stand without separation longer than the others.

Iceland moss is official in the Pharmacopœia as *Cetraria*, species *Cetraria islandica*.

Its principal constituent is lichenin, which may be obtained as a starchy, mucilaginous substance by boiling the drug in water. The bitter taste is due to cetraric acid, or cetrarin, which may be removed by treating with a weak alkaline solution. In preparing the Iceland moss gelatin for trial as an emulsifier, the operation was conducted in the manner given above for making the Irish moss gelatin, excepting that the Iceland moss was first garbled and then macerated for two hours in tepid water containing a little carbonate of sodium in solution and afterwards washed well in cold water. The four ounces of cetraria used yielded one ounce of gelatin, or twenty-five per cent. less than the amount obtained from the same quantity of Irish moss. It has a slightly brownish color, is semi-transparent and somewhat hygroscopic, as when freshly made it had a decidedly short fracture, while in a few days it was found to be very pliable and even tough.

On attempting to make an emulsion according to the formula given above, using Iceland moss gelatin in place of the Irish moss gelatin, it was a complete failure, the mucilage apparently not having the adhesive qualities necessary; but upon the addition of a small quantity of gum acacia to it an emulsion was easily formed, which, although it separates in a short time, readily shakes up to a fairly good emulsion.

In conclusion I would say that while the mucilage prepared from Irish moss has proved to be a sure and safe emulsifier, I doubt its advantage over gum acacia to the dispensing pharmacist in prescription use, excepting, as remarked before, where it could be used when freshly made in making a stock emulsion or a large quantity at one time.

The difficulty experienced with the apparatus at the command of the pharmacist, and the time occupied in making a good quality of the gelatin and again in making the mucilage from the gelatin, and allowing it to cool, when required for use, places gum acacia *first* as an excellent emulsifier when rightly used, both as to convenience, time occupied and quality of the emulsion, and expense also if the pharmacist figures time necessary to the manufacture of the gelatin.

ON BLAUD'S PILLS.

By JOS. W. ENGLAND, PH. G.

Read at the Pharmaceutical Meeting, March 15th.

Every little while a call is made for Blaud's pills and whenever practicable the use of Vallet's ferrous pill-mass is recommended as far preferable as it is more definite and contains a larger proportion of ferrous carbonate, with little tendency to harden or become oxidized. For some time past the following formula has been used with great satisfaction :

Ferrous sulphate, exsiccated ; sodium bicarbonate, *aa* gr. xviii ; water mxii ; powdered althæa, gr. xii ; glycerin q. s. ; make into xii pills.

Put the salts into a porcelain mortar, add the water and allow them to stand till effervescence ceases ; triturate to dryness, add the marsh-mallow powder, then the glycerin and form a mass ; enclose in gelatin capsules. The chemical decomposition is expressed by the following formula :



The advantage that this formula possesses over the older ones is that the conversion of the ferrous sulphate into carbonate is complete before forming the pill ; secondly, that there is no excess of moisture, through the subsequent evaporation of which the mass becomes hard ; and thirdly, that the employment of althæa gives body to the mass, whilst the glycerin tends to prevent hardening, a result which en-

closing them in gelatin capsules also assists. Care must be taken that the complete conversion of the entire mass into carbonate has taken place, or the escape of carbonic acid would destroy the pills or render them full of fissures and unsightly. In appearance they are green, the same color as Vallet's mass, which contains 42 % of FeCO_3 ; they possess the same medicinal properties and contain theoretically 33 % ferrous carbonate; hence the use of Blaud's pills would seem needless when we have such an efficient and superior substitute in Vallet's mass to take its place; but methods are oftentimes staunchly adhered to, even whilst the adoption of a new method, process or suggestion, no matter how excellent it may be in itself, becomes a matter for consideration.

LIQUOR HYDRARGYRI CHLORIDI CORROSIVI.

By E. H. NAUDAIN, PH. G.

In the compounding of prescriptions containing small quantities of bichloride of mercury such as $\frac{1}{4}$ or $\frac{1}{8}$ of a grain, which quantities are now largely prescribed by physicians in antiseptic solutions, eye waters, injections, etc., almost every druggist has no doubt been forcibly reminded of the great inconvenience attendant upon the weighing and dividing of a body so specifically heavy as this salt.

Having been called upon recently to compound a large number of prescriptions containing $\frac{1}{4}$ or $\frac{1}{8}$ grain of bichloride, I was led to prepare a standard solution, one fluid-ounce of which contained 2 grains of the salt. This solution has been of the greatest convenience, at the same time its use insures a far greater accuracy than the weighing and dividing.

It appears to me that such a solution would be worthy of introduction into the next Pharmacopœia under the name of *Liquor Hydrargyri Chloridi Corrosivi*, and if so introduced would be a preparation of the greatest value both to the physician and the druggist.

There is already a preparation, similar to the one proposed, official in the British Pharmacopœia and also in the French Codex, neither of which, however, are applicable to the wants of the physicians and druggists of this country.

I would propose a solution of which one fluid-ounce represents two grains of bichloride of mercury (1 part in about 225); by making it this strength, the $\frac{1}{4}$ or $\frac{1}{8}$ grain is more easily measured. $\frac{1}{2}$ or 1 fluid

drachm, respectively, being equivalent, of course, to $\frac{1}{8}$ or $\frac{1}{4}$ grain of the salt.

NOTE.—Liquor Hydrargyri perchloridi, *Brit. Phar.*, consists of corrosive sublimate 10 grains, ammonium chloride 10 grains, and distilled water 20 fluid ounces (imperial measure.) The solution of the corrosive sublimate of the *French, Belgian and Portuguese Pharmacopœias* is *Van Swieten's liquor* and consists of one part of corrosive sublimate dissolved in 900 parts of distilled water and 100 parts of alcohol.—Editor.

SPECIFIC GRAVITY.

By A. B. TAYLOR, PH. M.

In the February number of this journal I suggested an easy method of taking specific gravities of liquids.

Mr. Robert B. Warder in a communication to the *Pharmaceutical Record*, March 1st, in commenting upon it states that "the essential point of the suggestion depends merely upon giving the bulb a certain volume, so that it will displace 100 grains of water, or be equal in bulk to 105 minims."

While this is true, the result cannot be accomplished in any other method so readily as by making the weight of the bulb equal in number of grains to its specific gravity.

For example, it would be very much more difficult to make a piece of glass of such a size that it should displace exactly 105 and a fraction minims of water, or a certain fractional number of c. c., than it would be to make it weigh the number of grains or grammes corresponding to its specific gravity.

Whether measured or weighed, its size would be exactly the same, and no matter what the specific gravity of the bulb may be, if it measures 105 minims, its weight will be exactly one hundred times the number of grains corresponding to its specific gravity. Here is an example where weighing would give more accurate results than measuring, besides being much more practicable.

The remaining parts of Mr. Warder's suggestion "when the metric system is used, it might occupy 10 c.c. and displace 10 grammes of water," or, "glass could be weighted in the usual way to exactly 200 grains or 20 grammes," differ entirely from my suggestion, and are simply a return to Gannal's method, for description of which see *Remington's Practice of Pharmacy*, p. 75.

GLEANINGS FROM THE GERMAN JOURNALS.

BY JOHN A. MARTIN, PH. G.

Phosphorus Pills.—After many trials, Mr. Fischer found the following method the most satisfactory one for making phosphorus pills. Place the prescribed amount of phosphorus in a test tube containing a small quantity of chloroform and carefully apply heat until the phosphorus is all dissolved. Add the solution of phosphorus with constant stirring to a melted mass consisting of two parts yellow wax and two parts cacao butter, taking care to keep the mixture warm until the chloroform is all expelled. After cooling mix the mass with one part of carbonate of magnesium, divide into the required number of pills and coat them with gelatin. *Pharm. Zeitg. f. Russ.* 1887, page 674.

Kefir or milk wine.—Reeb in *Journal Ph. d'Als. Lorr.* gives the following improved formula: To fresh milk acidulated with a small quantity of citric acid, add two per cent. of simple syrup and shake the mixture vigorously to insure more active fermentation. Cork securely in strong bottles and keep them undisturbed in a warm place. In three or four days the kefir is ready for use. It contains two per cent. of alcohol, is strongly effervescent and possesses a very agreeable bouquet. *Rundschau, Prag*, 1887, pg. 998.

Test for Acetanilid (Antifebrin).—Flückiger in *Ap. Ztg.* recommends the following method: Two centigrams acetanilid with one centigram caustic potash are triturated together, first wetting with a little chloroform; the mixture is at once placed in a test tube and very gently heated. The mixture becomes brown and emits the very peculiar smell and unmistakable vapor of isocyanphenyl. *Runschau, Prag*, 1887, pg. 897.

To destroy plant lice, Heuschke in *Berl. Pharm. Ztg.* recommends the use of a decoction of quassia wood in which green soap has been dissolved. When the plants are besprinkled with this solution the lice die at once and can be seen upon leaves the next day brown and dried up. The plants are not in any way injured. *Rundschau, Prag*, 1887, pg. 1001.

To decolorize carbolic acid that has turned red, J. Demont, in *Der Fortschritt*, 1887, 22, recommends to melt it on a water bath and mix 89 parts of the acid with 11 parts of alcohol. The resulting solution is allowed to cool and when the greater part has crystallized the excess of liquid is poured off and the crystals are well drained. The crystals

are pure white and yield when melted, an entirely colorless or only slightly reddish acid. *Pharm. Ztg.* 1887, p. 746.

Beta-Naphthol for medicinal use, according to Fischer in Berlin, *Pharm. Zeitung*, is sold at an unreasonably high price. A product equally as pure and decidedly cheaper can be obtained by recrystallizing ordinary naphthol of commerce from petroleum benzin. *Rundschau, Prag*, 1887 p. 998.

The Dangerous Character of Dinitrokresol.—Weyl, in a report before the Berlin Medical Society advises that the sale of dinitrokresol be prohibited. It is offered for sale in the market as a substitute for saffron and in a recent case in Berlin, made public, it was shown that used internally it had caused death. In making a purchase from an apothecary dinitrokresol was given instead of saffron as asked for, and its internal use, probably as an emmenagogue, produced fatal results. *Rundschau, Prag*, 1887, p. 959.

A Cure for the Morphine Habit.—Cramer, accidentally discovered in the tincture of castor, (castor 1, alcohol 5.) a remedy for breaking off the morphine habit. *Rundschau* 1887, p. 812. *Pharm. Centralh.*, 1887, p. 645.

For Mosquito Bites, Dr. Gerard recommends to paint the affected part with chloroform. The pain and itching are stopped at once, and the swelling is soon reduced. It can also be used for the sting of other insects. *Pharm. Post.* 1887, p. 676.

Porcelain Shot.—Under this name small white globules of porcelain are made in Munich. They are made to take the place of ordinary lead shot used for cleaning wine and medicine bottles, as porcelain is entirely free from the objection of producing lead contamination, which is often the result when ordinary shot is used. Their hardness and rough surface producing when shaken greater friction, adapt the porcelain shot well for quickly cleaning dirty and greasy bottles, and as they are not acted upon by acids or alkalies almost any liquid can be used.—*Rundschau, Prag*, 1887, p. 942.

Instantaneous Cold.—Under this name a convenient substitute for outward application of ice is made by Baschlin of Montpellier. It consists of felting made from cotton, jute, cotton-waste or china-grass, saturated with a mixture of several salts, (nitrate of ammonium, chloride of ammonium, nitrate of potassium and sulphate of sodium) which upon wetting with water produces a low temperature.—*Pharm. Centralh.*, 1887, p. 532.

Administering medicines warm.—Prof. L. Lewin, in Berlin. Klin. Wochenschrift, calls attention to the advantage for most purposes of giving liquid medicines warm. The medicine already at a temperature of 40° C. (104° F.) is absorbed much quicker and the results are more energetic, than when given cold. Warmed medicines need therefore be given in smaller doses. For subcutaneous injection warming is likewise recommended.—*Phar. Rundschau*, 1887, p. 284. *Phar. Zeitschrift f. Russ.*, 1887, p. 327.

Absorption of mercury by the skin.—According to experiments of Ferrari and Asmondo metallic mercury is not absorbed by the skin, at least not when the mercurial ointment does not contain mercury salts. The mercury cure depends upon the inhalation of the mercury, which is volatilized.—*Phar. Centralh.*, 1887, p. 645.

Fumigating Wax.—Kratzer in *Chem. & Drug.* recommends the following formula yielding a very fragrant product: Styrax 35 grams, shellac 50 grams, benzoin 195 grams, linden charcoal 58 grams, balsam of Peru, and oil of bergamot each 18 drops, oil of rose 10 drops. Melt the ingredients together roll out the mass and form into sticks.—*Rundschau, Prag*, 1887, p. 1000.

Remy's Antiseptic Solution is prepared by dissolving 5 centigrams of red iodide of mercury in a mixture of 30 grams of alcohol and 1000 grams of water.—*Pharm. Post*, 1887, p. 777.

Kephalgina a remedy for headache, according to Ztschft. A. V., consists of a mixture of antyryin 5 parts, roasted coffee 5 parts, and caffeine and salicylate of sodium each 2 parts, divided into 10 wafers. *Rundschau, Prag*, 1887, p. 942.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the AMERICAN JOURNAL OF PHARMACY.

HYDRASTIS CANADENSIS.—In a clinical and pharmaceutical study of the root by Givopiszew (*Thèse*, St. Petersburg, *Bull. gén. de therap.*, Feb. 29, 1888), the writer presents the following results, which, so he states, are "based upon a large number of clinical observations and experiments upon animals:" 1. The aqueous extract, even in large quantities, did not produce toxic effects in warm-blooded animals. 2. It always caused a diminution of blood pressure without a previ-

ous augmentation. 3. It always induced contraction of the uterus and its appendages. Under the influence of an aqueous extract of hydrastis the most intense contractions took place in cases of advanced pregnancy, or soon after delivery; the contractions were weakest in the virgin uterus. 4. Large quantities of the extract may induce premature delivery in the second period of pregnancy. As clinical results, the author concludes: 1. Hydrastis is an excellent means to combat uterine hemorrhages due to inflammation or false positions of the organ, as also against hemorrhages following the catamenial period, and in the case of too abundant mensual losses. 2. Uterine contractions produced by hydrastis are less intense than those from ergot of rye. 3. Its use produces no untoward effect upon the organism. Even when taken for a prolonged period it causes no gastro-intestinal troubles, and often ameliorates dyspepsias which have previously existed.

STROPHANTHUS SEEDS OF COMMERCE.—Mr. R. Blondel (*Jour. de Phar. et de Chimie*, March 1, 1888), putting aside several sorts as having a purely botanic interest, finds that the four principal species of strophanthus seeds now in the market consist of: 1. Strophanthus of the Niger, which most resembles the *S. hispidus* of the museums, though it sensibly differs from it in the form of the seed and the length and the abundance of the hairs. 2. Kombé strophanthus, which has longer hairs, and seed of a green instead of a brown color. 3. The Gaboon strophanthus, whose seeds are brown, thin, and perfectly smooth. 4. The Zambesi strophanthus, whose seeds are of a greenish gray color, thickly covered with long, soft and shining hairs. The two first are less plentiful in the market than the others, and the third is still somewhat rare. This one—from the Gaboon—appears to be remarkably active. This is the sort used by Polaillon and Carville for their first researches, and later by Hardy and Gallois for the extraction of strophantin. It is, therefore, the seed which physiologists have thus far called—though wrongfully—*Strophanthus hispidus*, *De Cand.* The fourth, the woolly seed of Zambesi, though rare in France, appears to have been much used in England, where it enters wholly or in part into the preparation of Fraser's tincture.

NAPHTHOL AS AN ANTISEPTIC.—Maximovitch (*Compt. rend.*, Jan. 30, 1888,) has concluded experiments which seem to justify his conclusion that, as an antiseptic, α naphthol is superior to β naphthol. The author has also determined the toxic energy of α naphthol.

Using an alcoholic solution of this naphthol, he found that in order to kill an animal with it he was obliged to inject, hypodermically, a quantity containing from 3 to 5 gms. of the substance. α Naphthol, he says, is therefore three times less toxic than β naphthol, while it is seven times less toxic than the mercuric iodide. The dose necessary to kill a man weighing 65 kilos, would be about 585 gms. *Nouveaux Remèdes*, of Feb. 24, 1888, calls attention to the fact that the author thus introduces a body which is antiseptic without being extremely toxic. "This is an extremely remarkable phenomenon," says the writer, "and until now, no one has been able to find an antiseptic substance aside from those which are extremely toxic. In order to kill the microbe we have been obliged to take the risk of killing the patient; it will now be possible for us to use substances which shall be toxic for the microbe while having but a slightly active influence upon man."

DANGER IN ANTIPYRINE?—At the *Académie de Médecine*, Feb. 14, 1888, Prof. Ball reported a case of intoxication, observed by Dr. Jennings in a woman, æt. 67, suffering from nodular rheumatism. The patient had been taking antipyrine for eight days in the quantity of 2.50 gm. per diem, when vaso-motor troubles appeared, first characterized by erythematous spots on the face, and swelling of the eyelids. Conjunctivitis and a generalized rash followed, and these symptoms were supplemented by anorexia, vomiting, tinnitus, torpor and refrigeration. The symptoms disappeared readily, however, after the administration of a few drops of the tincture of belladonna. Mr. Jennings thought antipyrine should be used circumspectly in the cases of aged or impressionable subjects. Drs. Sée and Dujardin-Beaumetz thought this statement would serve to warn the public of the untoward symptoms to which antipyrine—whose use was abused at present—might give rise. They thought, however, that the symptoms were not those of intoxication, properly so called, and did not justify the use of belladonna, still less of atropine. They had sometimes observed gastric troubles following the giving of antipyrine, but thought these were due to impurities, as the medicament often contains benzene. Re-crystallized antipyrine was recommended; but if gastric symptoms persisted, they should be combated, the professors thought, with bicarbonate of sodium and Seltzer water. *Arch. de pharm.*, March 5, 1888.

CHLORIDE OF SODIUM IN MIGRAINE.—Batom (*Raccoglitore med.*

Dec. 1887; *Bull. gén. de thérap.* Feb. 29, 1888), reports six cases of hemicrania cured by giving from one half to one teaspoonful of table salt dissolved in a wine glass of water. It should be given on the appearance of the first symptoms, when it generally aborts the attack; when the seizure is established also, it gives way very rapidly to this treatment. The writer thinks the remedy will be of especial value when the trouble arises from gastric disturbances. He ascribes the results to the reflex action caused by the salt—the same explanation given by Nothnagel concerning the value of salt in epileptic seizures.

THE FERRIC SALTS ADMINISTERED HYPODERMICALLY.—Dr. Scipione Losio gives (*Rivista clinica*; *Bull. gén. de thérap.*, Feb. 29, 1888) the results of clinical studies undertaken in this direction. He made use of the lactate, ferro-sodic pyrophosphate, albuminate, citrate, tartrate, sulphate (precipitated with alcohol), and citro-ammoniated pyrophosphate of iron, and all of these salts were used in solution in distilled water at $\frac{1}{2}$ to 100, 1 to 100 and $1\frac{1}{2}$ to 100. The author draws from his experiments the following conclusions: 1. The therapeutic action of the salts of iron introduced hypodermically is much more efficacious, and the effect is more promptly felt, than when given by the digestive tract. 2. Of the various salts of iron, the citro-ammoniated pyrophosphate is best suited to the end in view. 3. Next to this, the preference should be given to the lactate and the albuminate; they do not give rise to abscess, and the smarting is less intense and of shorter duration.

INNOCUOUSNESS OF THE SALTS OF NICKEL.—Professor Riche (*Comptes rend.; Répert. de Pharm.*, February, 1888,) states that the salts of nickel (which have been thought toxic), should range with the salts of iron. In experiments with dogs and guinea-pigs he has given doses varying from 120 mgm. to 1 gm. 270 mgm. without causing serious disturbances. One dog absorbed 21 gm. of the acetate of nickel in sixty days, and far from succumbing, actually increased in weight. We cannot form conclusions concerning man from these experiments, says Prof. Riche, but we may be justified in supposing that the use of nickel for culinary utensils is no more injurious for man than the use of iron would be, to which metal it bears much resemblance.

SYRUP AND PASTILLES OF SACCHARIN.—For the former, Kügler (*Journal de Ph. et de Ch.*, March 1, 1888,) gives the formula: Saccharin, 10 gm.; bicarbonate of sodium 12 gm.; distilled water 1000 gm.

For pastilles the proportions are: Saccharin, 3 gm.; sodium carbonate, 2 gm.; mannit, 50 gm.; make 100 pastilles, each of which will sweeten a glass of water. [Mannit may be obtained by treating manna with boiling alcohol and crystallizing from hot alcohol.]

ELIXIR OF SACCHARIN.—At the *Soc. de méd. pratique*, February 2, 1888, Mr. Petit proposed the following formula for a “chartreuse” suited to diabetic affections: Elixir of chartreuse, free from sugar, 100 gm.; alcohol of 50 per cent., 900 gm.; saccharin, 3 gm.; bicarbonate of sodium, 1.50 gm. The soda is added to neutralize the saccharin, and render the mixture soluble. The elixir of chartreuse is compound spirit of melissa.

NOTE ON SANDAL WOOD OIL.¹

BY PETER MACEWAN.

At the Evening Meeting last November there were amongst the specimens exhibited two samples of sandal wood oil which were of more than ordinary interest. One was an oil especially distilled in Mysore for the Museum of this Society, Dr. Bidie, of Madras, having got this done at Mr. Holmes' request. This specimen is undoubtedly authentic, and has a special interest to pharmacognosists, as hitherto there have been some doubts in regard to certain physical properties of Indian-distilled sandal wood oil. The other specimen was an oil distilled from the wood of the Fiji tree, *Santalum Yasi*, a quantity of which came to the Museum from the Colonial and Indian Exhibition. Mr. Umney subjected some of the wood to distillation and obtained from it the unusually large yield of 6½ per cent.

Sandal wood oil is one of those which may be said to be chemically inactive, for with the ordinary essential oil reagents the color reactions obtained are of little value; for example, with sulphuric acid the oil gives a red-brown coloration, and resinifies, with nitric acid it gives a light-brown, and so on. Such reactions as these, varying as they do with the proportions used, cannot be construed into anything valuable. I may say at the outset, therefore, that the purely chemical tests have been applied to the specimens before us without eliciting any important difference between them, and it will be advantageous to confine this note to a record of the physical characters of the oils.

¹ Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Wednesday, February 8.

In a very exhaustive paper on sandal wood and its oil (*Pharm. Journ. Trans.*, [3], xvi, 819)¹ Mr. Holmes has shown, with the assistance Mr. W. H. Ince, that while commercial sandal wood oil has a specific gravity near the nine hundred and seventies, Indian-distilled oils may go as high as 0.9901. Moreover the Indian Pharmacopœia standard—0.980—is much higher than any other standard. The question therefore arises, is this high degree of density natural, or is it due to the addition of a foreign substance—a fixed oil, for example? It was a settlement of this moot point which Mr. Holmes had in view when he asked Dr. Bidie to get him a specimen of pure oil.

It will be seen from the specimens on the table that the Indian and Fiji oils differ in appearance. The former is much more viscous than the latter, is of a dark amber color, and is not quite clear, owing to the presence of a trace of water. The Fiji oil is of a pale straw color, and is perfectly transparent. Each dissolves in less than its own volume of rectified spirit; thus a mixture of equal parts of spirit and oil takes up another part of the oil. Both dissolve in their own volume of the mixture of proof spirit, 1 part, and rectified spirit 3 parts, which was used by Mr. Holmes to detect the presence of cedar wood oil. Of this mixture 1 part of an Indian oil reported upon by Mr. Holmes required 1.1 part for solution. The slight difference is of little importance, and is probably due to Mr. Holmes' specimen being an old one.

Specific gravity was determined at 16° C., or somewhat lower than the temperature (65° F.) at which Mr. Ince made his determinations. The results were :—

Indian Oil.....	0.9896
Fiji Oil	0.9768

Although the purity of the Indian oil is unquestionable, fixed oil was looked for and with negative results.

It was found that the Indian oil began to boil at 289° C., and the Fiji oil at 277° C. In "*Pharmacographia*" the boiling point is given, with reserve, as 214–255° C.; but this is too low, that given by Chaptault (300–345° C.) is nearer the truth. A careful determination of this factor with a fair number of samples would, I think, be valuable. We require a reliable factor for our text and reference books.

The next and the last point for determination was the specific rotatory

¹ See American Journal of Pharmacy, 1886, pp. 254–263.

power of the oils. On this point you will find wonderful variety in the records of the observers. I may quote a few :—

Dr. J. H. Gladstone.....	—50°	(sp. gr. 0.975)
"Pharmacographia,".....	—18.6°	(Schimmel's oil)
"....."	+ 6.75	(Venezuela oil)
Dr. Charles Symes.....	+ 2.96	(English oil, sp. gr. 0.958)
"....."	+ 8.29°	(foreign oil, sp. gr. 0.986)

I am indebted to the latter observer for a polarimetric examination of the two specimens under notice. Dr. Symes has examined them very carefully with two instruments and with different tubes, so that the results are certainly correct. They are as follows :—

Indian Oil.....	— 9.30°
Fiji Oil.....	—25.50°

A sample of English oil which he examined at the same time gave —15°.

It is evident from the foregoing that the high density of Indian-distilled sandal wood oil is a natural characteristic. How it happens that oil distilled from Indian wood in this country is not so high I will not attempt to explain; but it is clear that our pharmacopœial standard, 0.960, is much too low, and it would be advisable to change it to say 0.970—0.990. The Fiji oil is identical as far as these experiments show with ordinary oil of sandal wood.—*Phar. Jour. and Trans.*, Feb. 11, p. 667.

PATCHOULI OIL AND LEAVES.

In the March issue of the *Kew Bulletin* a few pages are devoted to information of a botanical and commercial character regarding *Pogostemon Patchouli*, the herb from which the patchouli oil of commerce is obtained, and about which, although patchouli was introduced into this country nearly forty-five years ago, much uncertainty still appears to prevail. The information collected by the *Kew* authorities is therefore doubly welcome, in so far as it serves to clear up certain points at issue concerning the habitat and varieties of the plant.

The supply of the dried herb as well as of the oil of patchouli has lately been very uncertain and insufficient, probably because the steamers plying between Europe and the Indian ports, from which the article is mostly shipped (*viz.* Penang and Singapore), refuse to accept consignments of patchouli on account of the danger that the

powerful odor of the oil may be communicated to other goods stored in the vicinity. It is scarcely possible that such communication could take place to any inconvenient extent if the patchouli were packed with sufficient care, and if the goods placed in the immediate neighborhood of the shipment were selected with some discrimination. But the fact remains that for a considerable time there has been a great scarcity, and that a market could be found in Europe for considerable quantities of fine leaves and pure oil, as patchouli, though perhaps its popularity as a perfume is slightly on the wane, is still used largely in conjunction with other essential oils, notably otto of rose, while the dried leaves are well liked as a sachet powder. Peisse, in fact, states that if the oil could be obtained more cheaply, the consumption would be increased tenfold. Planters in the Straits Settlements appear to have paid close attention lately to the propagation of the plant, and the head of the Straits Settlement Forest Department announces that during the year 1886 there has been a steady inquiry for young plants, which are easy of cultivation, and require but little attention. In August 1886 samples of three different varieties of patchouli were sent home to the Kew authorities, with a request for information concerning their commercial value and employment in Europe. The first two samples consisted of selected leaves of the entire flowering tops, the system of drying having been the same for both. The third represented leaves of the *Urena lobata*, which are used in the East to adulterate the true patchouli. The *Urena lobata* grows wild to a large extent in the cocoa-nut gardens near the coast, and its leaves are worth, locally, $1\frac{1}{2}d.$ to $1\frac{3}{4}d.$ per lb., whereas, for true selected patchouli leaves, as much as $6\frac{1}{2}d.$ per lb. is paid in Penang. The object of the Forest Department in sending home specimens of the adulterant was to know whether it contained any valuable ingredients or was merely added to the true herb in order to increase the bulk. The Kew authorities placed themselves in communication on the subject with a West-end firm of perfumers, a city wholesale drug-house, and a Mincing Lane importer of essential oils, but the answers of these three firms do not agree in every respect. The perfumers value the selected leaves at from $8\frac{1}{2}d.$ to $10\frac{1}{2}d.$ per lb., and the flower-tops at a less figure, on account of the worthless stalks, and they state, with regard to the adulterant, that they know it well, as it always occurs in the leaves bought by them for perfumery purposes. The value of the patchouli oil they consider to be 2s. 6d. to

3s. per oz. The wholesale drug firms value the selected leaves at 1s. per lb., and the flowering tops at 4d. to 5d. per lb. The adulterant, they say, is not known in the market, and is quite worthless. Lastly, the Mincing Lane importer estimates the picked leaves at 1s. to 1s. 3d., the tops at 9d. to 1s., and the oil, if pure, at 3s. to 3s. 9d. per oz. He also believes that from 10 to 20 tons of good leaves would find a brisk sale in London, while the wholesale druggists, on the other hand, advise shippers to be careful in not overloading the market, as a shipment of, say, 20 tons would probably cause prices to decline.

Whichever of these three advisers may be nearest the truth, it is pretty certain that patchouli is one of the few articles for which, at this moment, the demand exceeds the supply, and if shipments of good picked leaves could be quickly made to London, which is the central market, and whence the distillers in Germany and Southern France, as well as the American consumers, draw their requirements, the shippers would be able to pocket a very good profit. But it is not improbable that we shall soon receive supplies of patchouli leaves and oil from other than the accustomed quarters. In 1886 only 5,280 oz. of oil and some 18 cwt. of leaves were exported from Penang, whereas a few years previously the imports of leaves alone in London reached between 600 and 800 cwt. per annum. In 1886 a large German firm, with the idea of emancipating our market from its dependency upon the East, forwarded a supply of seeds to Paraguay, in South America, and, although the head of the Straits Settlement Forest Department reports that "plants raised from seed are said to have no scent, but they retain it when produced from cutting," the German house seems confident that their efforts will be successful. Patchouli-growing is also being tried in the island of Dominica, and we hear that experiments are said to have been set on foot in Guadaloupe, Martinique, and other French West Indian possessions. Some years ago supplies of patchouli leaves of very good appearance, though somewhat deficient in aroma, used to be imported into Europe from Java, but this source appears to have dried up lately. A few months ago inquiries were made at Kew by the India Office whether patchouli was known to grow to any extent in Assam and on the Khasia Hills, and whether it could be cultivated in Bengal. To these inquiries reply was given that Professor Oliver, of Kew, thinks it doubtful whether the patchouli plant is indigenous in India at all, a view shared by Mr. Threlton Dyer, who adds that he thinks it probable that China may

prove its true habitat, an opinion contrary to the generally prevailing one, which is that it is the Malay Peninsula. At Kew nothing is known of the existence of any form of *Pogostemon Patchouli* in the Khasia or Assam region, but some varieties of the plant in the wild state are found in British India, from Bombay southwards, and a plant with a patchouli odor, believed to be a variety of *Plectranthus*, is thought to be indigenous to Assam. The shipments of very stalky and feebly aromatic root which reach us occasionally from Bombay are perhaps derived from the former species. In connection with this it may be stated that the idea of the patchouli herb being a native of China probably originates from the fact that the block ink imported from that country possesses a distinct odor of patchouli. The introduction of the perfume to the European market is said to be due to the Lyons shawl manufacturers who, finding that the Indian shawls were always strongly scented with patchouli, imported the oil from the East to scent goods of their own manufacture.—*Chemist and Druggist*, March 17th, 1888, p. 360.

THE ORIGIN OF PETROLEUM.*

BY ALBERT H. SAMUEL, F.C.S.

I think it will be generally conceded that during the last half century the more civilized nations of the world have made advances in scientific discovery out of all proportion to those made in any previous period of a like duration, and among these not the least important have been those in that branch of science which treats of the natural history of the earth, the investigation of its structure, and the character and the causes of the changes which since its first development have been continually taking place upon its surface.

A study of the earth's history, such as the science of geology affords us, has the advantage over history in the general acceptation of that term, or a record of the events of mankind, inasmuch as the latter, however impartially it may be recorded, must be necessarily frequently fallible from want of strictly accurate information of the various scenes, periods and actions it may record, to say nothing of the bias of some of the writers.

*Address delivered before the Liverpool Chemists' Association, January 26, 1888; reprinted from *Phar. Jour. and Trans.*, Feb. 11, pp. 674-677.

On the other hand, in investigating the structure of the earth we find it is in itself what I may designate as an automatic historical recorder of the various epochs which, judging from the various strata, have succeeded one another since its earliest formation. A record of events formed in this way we are bound to consider as the most truthful and accurate historical record that we have, and where we find in it phenomena which we cannot completely explain, we may pretty safely assign the cause to our own inability, and rest assured that what we leave undetermined will be solved by subsequent generations.

Now the subject of my paper is one which an ordinary observer might think should be determined without any great difficulty, considering the vast supplies of petroleum that are daily brought forth from the interior of the earth to its surface in all four quarters of the globe. The fact remains, however, that up to the present the origin of the formation of this product, now invaluable to the wants of mankind, is still in the realms of scientific speculation.

As ardent lovers of scientific truth, we would prefer not to leave the solution of this problem to posterity, but rather endeavor ourselves to bring the causes of its origin completely within the range of absolute certainty. Whether our scientific knowledge of the earth's crust and interior is sufficiently advanced to accomplish this is an open question, and my purpose in the remarks I shall make to you will be confined mainly to placing before you as well and concisely as I can the reasoning of those who have put forward the most reliable theories on the question.

These may be considered as follows:—

1st.—The theory that regards petroleum as a *distillate* produced by natural causes.

2d.—The theory that regards petroleum as indigenous to the rocks in which it is formed.

3d.—The theory that regards petroleum as the result of a purely chemical action on purely mineral or inorganic materials.

The first two above mentioned are comprised under what is understood as the *organic* theory, and the latter as the *inorganic* theory.

Now it will be readily conceived by those who are accustomed to analyze the merits of conflicting theories that that theory which seemingly admits of the most actual proofs is the more likely to be the correct one, and may be said to emerge out of the realm of theory into that of comparative certainty. In this respect, in the present inquiry,

the advocates of the organic theory have the advantage, as they chiefly rely for their proofs on what is actually known of the geological formations of the earth's crust, whilst the advocates of the inorganic theory are compelled to ask you to accept for their proofs the existence of certain elements in a particular condition in the remote interior of the earth, to which human effort has been unable to penetrate, and of which, the existence can only be obtained by a purely deductive method of reasoning.

Let us then first consider the theory of inorganic origin. Who are its chief advocates, and what are their reasons? In the first place, I may state that until the discovery of petroleum in commercial quantities in the United States of America in the year 1859, very little attention had previously been drawn to this substance, even from a purely scientific point of view; but soon after its discovery, as it began to increase in commercial importance, the cause of its origin aroused the attention of our *savants*, and we find that in 1866 the well-known French chemist, Berthelot, drew attention to the subject, and came forward as one of the earliest advocates of the theory of pure chemical origin. He wrote that if it be admitted that the remote interior of the terrestrial mass contains free alkali metals, this hypothesis alone will furnish almost of necessity a method of explaining the formation of hydrocarbons, or carbides of hydrogen. He found by personal experiment that when carbonic acid and water, which he states everywhere infiltrate the earth's crust, come into contact with these alkali metals at a high temperature (such as would be the case far in the earth's interior) acetylides are formed. These acetylides, subjected to the action of vapor of water or steam, produce acetylene, and the products of the latter's condensation would form formenic carbides or hydrocarbons such as constitute American petroleum. He can, he says, thus effect the production, by a purely mineral method, of all the natural carbides or hydrocarbons. Heat, water, the alkali metals, coupled with the tendency of the carbides to unite to form more condensed matters, are sufficient to account for the complex mixture which we know as petroleum.

Five years later, viz., in 1871, we find another scientist of eminence, a member of the French Academy of Sciences, a Mons. M. H. Byasson, coming forward as an advocate of the mineral theory. In a paper published in the *Comptes Rendus*, he states, "In a research that certain considerations led him to undertake, he had, by causing carbonic

acid and water to react under very simple conditions, obtained a small quantity of an inflammable liquid with an odor analogous to that of the hydrocarbons of petroleum." The "simple conditions" were, causing steam, carbonic acid and iron at a white heat to react upon each other, and he provides the requisite conditions in nature, by assuming that sea water penetrates the earth's crust, and comes into contact with metallic iron at a white heat, and at great depths beneath the surface.

The most recent, as well as, at the same time, the most powerful supporter of the inorganic theory is the celebrated Russian chemist, Mendelejeff, known to all scientists more particularly in connection with his researches on the periodicity of the elements. He has personally visited the petroleum regions, both of his own country in the Caucasus, and those of North America, and as he has devoted considerable attention to the subject, his views must be received with that amount of weight and respect to which they are unquestionably entitled. His views on the question of the origin of petroleum are embodied in an elaborate paper read by him before the Chemical Society of St. Petersburg, which appeared in French in the *Revue Scientifique* of Paris, but has not, that I am aware of, been translated into English. The first part is devoted to combating the various statements that have been from time to time set forth by the advocates of the organic theory, and after demonstrating in detail the fallacies, as he considers them, of their premises, he devotes the remaining portion of his paper to building up a theory of his own, on the basis of purely chemical origin.

So far the advocates of the inorganic theory have occupied all our attention. Now let us for a few moments consider the views of its opponents, and we shall then be able to more readily understand Mendelejeff's views, to which we shall again return, and which may be considered as a reply.

In the first place, in order to somewhat clear the ground, I may state that the view that has been prevalent among many, namely, that petroleum owes its origin to the natural distillation of coal, is, I think, no longer tenable. Where petroleum is found in the neighborhood of coal, it is in strata far beneath those of the carboniferous era, and the coal above it is in perfect condition, and shows no trace of having lost any of its full and normal quantity of bitumens of hydrocarbons. I allude to this, as I notice in Fownes' 'Manual of Chemistry' it states

that, "Under the names of petroleum or rock oil are arranged various mineral oils, which are observed in many places to issue from the earth in considerable abundance, and there is every reason to suppose that these owe their origin to the action of internal heat upon beds of coal, as they are usually found in connection with such."

One of the earliest advocates of the organic theory appears to have been Dr. I. S. Newberry, an American, who in 1859 made an important communication on petroleum, in which he states that the precise process by which petroleum is evolved from the carbonaceous matter contained in the rocks which furnish it, is not yet fully known, because we cannot, in ordinary circumstances, inspect it. We may infer, however, that it is a distillation, though generally performed at a very low temperature.

Another American, Professor S. F. Peckham, in his elaborate monograph on petroleum, published in connection with the 10th Census reports of the United States Government, and which I may say here is the most perfect and exhaustive work on the subject I have seen, treats the question we are discussing at some length, and states that his researches, extending over a period of more than twenty years, convince him that all bitumens (including petroleum) have in their present condition been deprived of vegetable or animal organisms, but the manner of their derivation has not been uniform.

I may here state that petroleum has been found in all geological strata, from the Silurian up to the Tertiary; but it occurs principally in only two of these epochs, namely, the Silurian and the upper division of the Tertiary period.

In the vast petroleum regions of Pennsylvania, Ohio, etc., petroleum is found saturating heavy beds of uncemented sandstone. Beneath this sandstone or sands, as they are called, are shales as much as 1600 feet in thickness. Professor Peckham says no one can examine this strata without noticing the immense quantity of fucoidal remains that it contains.

He says if, however, the Devonian shales are inadequate, both on account of extent and supply, to account for the production of the vast supplies of petroleum, we may descend still lower in the geological series to the Silurian limestones of over 1200 feet in thickness, containing geodes or cavities filled with petroleum. Too little is known, he says, about petroleum to enable anyone to explain all the phenomena attending its occurrence or any hypothesis, but it seems to him

that the different varieties are the product of fractional distillation, and that one of the strongest proofs of this hypothesis is found in the large content of paraffin wax in the Bradford oil (Penn.) wells under the enormous pressure to which it is subjected. If, he says, the organic theory, which embraces all the facts that have thus far come within our knowledge, really represents the operations of nature, then we must seek the evidence of heat action at a depth far below the unaltered rocks in which the petroleum is now stored. We ought to expect to find the coal in its normal condition. We should not expect to find the carbonized remains of organisms in the rocks containing petroleum. If petroleum was the product of a purely chemical process we should expect to find a general uniformity in its character wherever it was found, whereas Professor Peckham says, we find that petroleum from the Silurian strata containing mixtures of hydrocarbons only, without any trace of *nitrogen*, and petroleum from other parts of the world from tertiary strata containing *nitrogen*. This fact lends additional weight to the theory of organic origin, as the petroleum from the Silurian formations corresponds in its composition with a natural distillation of the simple animal and vegetable organisms that flourished in that remote period or epoch, and the Tertiary petroleums containing nitrogen prove their being the result of the decomposition of more highly organized beings, such as flourished at a later epoch.

The advocates of that side of the organic theory which regards petroleum as indigenous to the rocks in which we find it, are mainly Professor Leslie and Dr. Sterry Hunt, both well-known geologists. They base their view on their observations in West Virginia, Canada and Kentucky. They find the Silurian limestones in those districts contain fossil corals and geodes, in all of which the oil appears to be hermetically sealed until the mass is broken. They think that these were probably deposited in a deep sea at a somewhat high temperature in which vast quantities of sea animals perished and became buried; they therefore consider it most strictly in accord with observed facts to assume that in whatever manner the oil may have been produced from the original animal organisms it is indigenous to the rocks in which it is now found. The above statement, I think, will prove sufficient for my purpose, namely, to place before you the principal views of the advocate of the organic theory, and if I may trespass a little longer on your patience we will now return to a consideration of

Professor Mendelejeff's views, as the chief advocate of the inorganic theory.

Mendelejeff states, that if petroleum is really of organic origin we ought to find in the strata from which it is said to originate an enormous quantity of *carbon residues*. Now, he says, this is precisely what we do not find either in the Silurian limestones, the Devonian strata or in the Petroliferous sands, from the latter of which we now obtain the oil. Again in Russia, in the Caucasus, we generally find petroleum in the midst of the Tertiary formations, which are relatively of recent origin. Now, in order to prove the truth of the organic theory, he says, we are asked to suppose that the petroleum of these strata has been formed at the expense of *organic remains* either of the Tertiary period or of more ancient periods, of which the remains lie below. But, he says, this hypothesis is no more admissible, for we cannot find the primary matter that has been able to furnish a like quantity of petroleum and no carbon residues. Now, he says, no one can suppose that petroleum has an organic origin, whilst this origin is not explainable by the presence of an enormous quantity of organic remains. Otherwise it would be necessary to admit what is impossible, namely, that the distillate has remained, whilst the solid residues have disappeared. He states that his own personal researches in the petroleum regions of the United States and the Caucasus lead him to seek the place of original formation of petroleum at such depths in the interior of the earth, as to place the question of organism or organic origin out of the question entirely, and the act, he says, which pleads most in favor of this view, is the existence of the seat of the petroleum nearly always in the neighborhood of *mountain chains*. In Pennsylvania, the Alleghanies are to the petroleum regions there what the Caucasus mountains are to the regions of petroleum in the Baku district. Again the next most prolific producing country is Galicia, in which the wells are most numerous close to the Carpathian mountains. It is also a curious fact that the geographical distribution of the sources of petroleum takes the course of a broken but straight line.

This direction, so well-known to American producers, is parallel with the direction of the chain of mountains. This is why the Americans speak of a subterranean river of petroleum and of subterranean lakes formed by its overflow. This geographical direction, Mendelejeff states, is irrefutable. From Bradford, (Penn.) and Oil City far away

to Karne's city, one can trace an almost straight line of petroleum-bearing wells, parallel to the Alleghany chain of mountains.

Now, he states; these mountain chains have been formed by elevation caused by the slow but continuous action of the internal forces of the earth. This elevation has produced a cleavage at the summits of the mountains, and consequent exposure of the various strata which, prior to the cleavage, lay one above the other in a horizontal position. At the base, a similar and parallel cleavage would be formed. This opening would be filled up by time, but after going a certain depth it should still exist, if the strata which are raised on the sides of the mountains were before their upheaval almost horizontal, as geology proves them to have been. This great fissure at the foot of the mountains has freed a passage for the petroleum, and has formed at the same time galleries in which the oil has entered and has risen from within the depths of the earth, where in ancient times its formation had taken place.

How the oil is produced in these remote depths in the earth's interior, Professor Mendelejeff now proceeds to explain by an elaborate but highly interesting process, of which I must limit myself to giving you but a very abbreviated outline. He humorously remarks that when one engages in a study connected with the depths of the earth, one is perforce obliged to engage in the depths of science also. Taking as his basis the well-known theory of Laplace of the earth's creation, he says the mass of vaporous matter (ultimately to form our planet) thrown off into space from the solar atmosphere, would at first have the form of a ring, analogous to that of Saturn. In this ring, in which the temperature would be very high, all the elements are in a state of vapor. On the gradual cooling first of the circumference, these elements would condense by degrees, and chemical combinations commence. The metals uniting with oxygen would produce oxides, which would fall towards the centre in the form of rain or snow, decomposing again, on arriving at a certain depth. This is the reason, he says, why in the crust we have chiefly elements and matter whose vapors have a low density. In the interior, on the contrary, would be found elements whose vapors have a high density.

This leads us to the conclusion that at the centre of the earth ought to be accumulated elements having high atomic weights; and we know that the lighter elements do predominate in the composition of the earth's crust, such as hydrogen, carbon, nitrogen, oxygen, mag-

nesium, aluminium, silicium, phosphorus, sulphur, chlorine, potassium, calcium, and also the greater part of their combinations have not a higher gravity than $2\frac{1}{2}$ times that of water. Now, states Mendelejeff, the density of the globe is found to be five times that of water, consequently in the centre must predominate forms of matter heavier than those composing the crust.

Now what are the elements of a heavy atomic weight which we ought to expect to meet with in the interior of the earth? Such elements ought also to some extent be found in the crust, as when the whole earth was in a state of vapor, the heaviest vapors would mix with the lightest, in accordance with the law of Marriotte. Further, the elements such as ought to be found in the earth's interior, ought also to be in large quantity in the solar atmosphere, if the earth was originally part of that atmosphere.

In reviewing the different elements Mendelejeff finds that *iron* only, satisfies all these conditions. Now if in the earth's interior iron predominates, whose density is seven and if the earth's crust is composed of substances having an average specific gravity of about three, as is found to be the fact, the specific gravity of the whole earth will be equal to the mean of these two densities three and seven, that is, it will be about five. Now five is precisely the mean density of the terrestrial globe.

Now, says Professor Mendelejeff, in what state ought we to suppose the iron to be in the earth's interior in order to solve the question under consideration? In the earth's interior there has never existed but a very small quantity of oxygen, for the reason that the atomic weight and the molecular weight of this gas are low, and further, that oxygen, as we know, cannot be liquefied either by pressure or any other force. If we have iron, carbon and oxygen at a high temperature, it will happen that the combination of the oxygen will take place according to the proportion in which it is present. If there be little oxygen and much iron and carbon, it is with the carbon that all the oxygen will combine, and the iron will remain free or will be carburetted, in which state Professor Mendelejeff believes it no doubt is in the earth's interior in conjunction with other metallic carbides.

Now, the fissures already explained, produced by the elevation of mountain chains, have permitted water to penetrate to the depths of the earth and to reach these metallic carbides. The iron and other metals combine with the oxygen of the water; hydrogen is in part set

free, and partly combines with the carbon, and thus are formed *volatile hydrocarbons*. Further, with considerable pressure, an excess of hydrogen and lengthened contact, the result can only be hydrocarbons, rich in hydrogen, such, precisely, as are those of which our petroleum is composed. The water coming into contact with matter in a state of fusion is reduced to vapor. Part of this steam rises through the crevices in the strata, carrying with it the vapors of the hydrocarbons. These hydrocarbons are subsequently liquefied, and accumulate in the rocks already prepared to receive them.

The question of the Origin of Petroleum is one of great importance, as up to the present time petroleum explorers have had no absolute scientific data on which to base their operations in seeking for new oil-bearing districts; but if the inorganic theory prove to be the correct source of origin, then Professor Mendelejeff's explanation may be the means of rendering eminent service to the future development of the petroleum industry, by affording definite rules on which to make further petroleum discoveries with success.

It has been frequently asserted that at no very distant date our petroleum supplies will be exhausted, and therefore this question of origin has an important bearing on the supply if the organic theory be the accepted one, namely, the result of metamorphic action on vegetable or animal organisms, its generation, as Peckham says, is co-existent only with that metamorphic action, an action which we have no reason to believe has been prevalent on a large scale during the recent geological periods, and therefore the generation of petroleum has been practically ended. If, on the contrary, we accept the inorganic or chemical theory, we provide for a process the conditions of which are perpetually renewed and continuous, and at present active.

The rise and progress of the petroleum industry has been the most remarkable and rapid of any branch of commerce of modern times, and it has already exercised a marked influence on our modern civilization. To recount the numerous uses to which it is now applied is not within the scope of my present paper. It is sufficient to say that as the cheapest and one of the most brilliant illuminants the world has yet discovered it has added largely to our social comfort and happiness. It has enabled the poorest of our workpeople to considerably extend their hours of labor, thereby increasing their power of wage-earning. It is rapidly displacing all other illuminants. As a lubri-

cant it has superior qualities to all animal or vegetable oils, owing to its freedom from oxygen, as well as its cheapness in comparison with these oils. Its use as the cheapest of fuels is of the first importance, although, we may say, as yet in its infancy for this purpose; but that it will ultimately displace coal in the merchant and naval marine of all nations, is, in my opinion, but a question of no very distant time.

Whether from a scientific or commercial point of view we must all admit that it would be a great loss to mankind if the supplies of this almost invaluable natural product were at no distant date to be exhausted, and for this reason I considered it might be of special interest to bring the question of its origin under your notice, and I trust I have, however crudely, succeeded in placing before you the various opinions of those best qualified to form a judgment on the question at issue.

CRYSTALLIZED MERCUROUS IODIDE AND BROMIDE.

BY A. STROMAN.

If a saturated solution of mercurous nitrate, as free as possible from oxide and slightly acidified with nitric acid, is heated to boiling with iodine, the latter becomes covered with a yellow powder, which partially dissolves, and the solution, after decantation into a warm dish, deposits, in the dark, lustrous, yellow, transparent, tetragonal scales of mercurous iodide; these must be dried in the dark at the ordinary temperature. When the mercurous nitrate solution is treated with an alcoholic solution of iodine in the cold, small, yellow spangles of mercurous iodide are obtained; but the product formed by the old methods of preparation, that is, by rubbing together molecular proportions of mercury and iodine, and by adding potassium iodide in solution to a solution of mercurous salt, have a green color, and are impure, although the pure yellow compound can be obtained by reversing the last process and adding an excess of a dilute solution of mercurous nitrate to potassium iodide in solution. The crystallized compound shows the same color-changes as observed by Yvon (this Journal, 1873, p. 474 and 525), but the change does not begin at 60°, as stated by him, since the salt is still a pure yellow at 100°, and only passes from this color through dark yellow and orange to garnet-red at higher temperatures. Sublima-

tion commences at 110—120°, not at 190°, as stated by Yvon, and the salt fuses at 290° with decomposition. Towards acids and solvents, the crystallized compound behaves like that precipitated by potassium iodide; ammonia and caustic alkalis render it green, and on heating convert it into the corresponding alkaline iodide and metallic mercury. The crystallized iodide is less sensitive to light than the precipitated yellow compound, which rapidly becomes black even in diffused daylight.

When mercurous nitrate solution is treated with bromine under similar conditions, small, white, nacreous, tetragonal scales of mercurous bromide are obtained, and the same compound separates in yellow, crystalline spangles when an alcoholic or aqueous solution of bromide is employed. It sublimes at 340—350° in small scales, is less sensitive to light than the iodide, dissolves in hot sulphuric acid with the evolution of sulphurous anhydride, becomes black and gradually decomposes when heated with dilute and concentrated hydrochloric acid, dissolves slowly in hot nitric acid (sp. gr. = 1.42), and decomposes with the formation of the corresponding bromides when treated with ammonia and caustic alkalis.—*Jour. Chem. Soc.*, 1888, 111; *Berichte*, XX., 2818.

COMBINATION OF SILVER CHLORIDE WITH METALLIC CHLORIDES.

By M. C. LEA.

If hydrochloric acid is mixed first with ferric chloride and then with silver nitrate, the silver chloride which forms is not white but buff-colored. The ferric chloride cannot be removed by washing, and is only partially removed by treatment with hydrochloric acid. The presence of the minute quantity of ferric chloride makes the silver chloride remarkably less sensitive to light.

Cobalt chloride and hydrochloric acid give a silver chloride, which is pink, and contains cobalt; but the reduction in the sensitiveness to light is very much less than when iron is present. Nickel and manganese behave similarly, but cupric chloride seems to have no tendency to combine with silver chloride. The tendency of gold chloride to combine with the silver chloride is, however, well marked, and the precipitate has a reddish shade, but the influence on the sensitiveness is not

easily determined, since the gold is rapidly reduced to the metallic state, and the silver chloride darkens to black instead of to chocolate or violet, as would be the case if it were pure.

In analytical determinations it is important to digest the silver chloride for a considerable time with hydrochloric acid, and even then it is doubtful if the foreign chloride is entirely removed, especially if it is ferric chloride.

These observations show that silver chloride has a great tendency to combine with small quantities of other chlorides, and supports the author's view as to the nature of the "photo-salts." They also explain the fact that a small quantity of mercuric chloride very greatly reduces the sensitiveness of silver chloride to light. In order to ascertain the presence of mercury in the silver chloride, the author employs a solution of stannous chloride in hydrochloric acid, which has no action on silver chloride if light is carefully excluded, but gives a brown or brownish-black color to the precipitate if mercury is present. The author was unable to remove mercuric chloride from silver chloride even by very prolonged washing.

Poitevin's observation that his colored photographic images resisted the action of light better after they were treated with dextrin and lead chloride is explained by the tendency of the lead salt to prevent alteration of silver chloride.—*Jour. Chem. Sci.*, 1888, p. 109; *Am. Jour. Sci.*, XXXIV., p. 384.

ON COCA.

By DR. H. H. RUSBY.

From a lecture at the Philadelphia College of Pharmacy, December 1, 1887, stenographically reported by Dr. C. H. Morgan.

As an indigenous plant coca is perhaps unknown. It frequently occurs in a wild state and in situations where escape seems to have been impossible. Yet, in some such cases I have traced its origin directly to escape from cultivation. So it is difficult to determine its origin in any case. The varieties of coca are two, the Peruvian and Bolivian. I have here some specimens of coca which I gathered myself and I can therefore bear witness to the accuracy of determination. The specimen which I hold in my right hand is Bolivian coca. It is the finest variety of coca which exists. You will observe there are two plants represented on this sheet. One is without leaves, they having been picked for the market. On the other the leaves still exist. Observe the size and form of these leaves, if it is not too far away from you. This is Peruvian coca

which I hold in my left hand—just see what a difference there is in the form, in the size and in the texture of the leaf. This specimen I collected under peculiar circumstances.

There are two rivers which unite at this point, they come from near the foot of the mountain, one from Cuzco, Peru, and the other from La Paz, in Bolivia. Now all the way down this river coming from Bolivia we find the wild coca exists. It is of the Bolivian form, but as soon as we strike the other we find the larger leaves, the Peruvian form. So that here we have two species, or not two species, but two varieties.

Here we have a form of diseased coca, called Taja. It is probably a fungus which produces this peculiar condition. We know this condition can be produced in the leaf by simply picking them carelessly so that the twigs are wounded. Then when the new leaves are produced they present this appearance.

This is a sufficient comment upon the idea which has lately been advanced by a writer to the effect that some of the coca leaves which reach the market are beaten off from the plants with poles, an opinion which is evidently erroneous. If an attempt were made to beat the leaves from the plant with poles, the owner would never get another crop.

In this specimen the lines are much less prominent than in the cultivated form. Two other forms of coca which I have here, I should rather say not of coca, but of *Erythroxylon*, are distinct species growing throughout the Eastern section and even through Brazil.

I wish, gentlemen, I had time to show you all my specimens. Perhaps many of you would be as much interested in them as I am myself, but it impossible for me to do so.

These two varieties of coca, the Bolivian and the Peruvian, are so different that one Bolivian writer has described the Bolivian form under the name of *Erythroxylon Bolivianum*. The name, however, is not correct, both are *Erythroxylon Coca*. I am not certain, however, that these two cultivated forms have not descended from distinct species. The two varieties are distinguished not only by the leaves but by the fruits which are much larger in the Bolivian species, while the leaves are much larger in the Peruvian species. The Bolivian variety is much higher esteemed by the Peruvians, they saving enough from their scanty earnings to purchase one-third of the Bolivian product, although you can obtain the native article at a much lower price. As you are students of Pharmacy, and I think are about to study up the subject, perhaps a few facts on the chemical constituents of the leaves might be interesting and I will give them to you very briefly.

You are aware that there are two methods of estimating the cocaine which the coca leaves contain. The first is to extract it in the pure form and weigh it. This method was impossible for me, traveling as I was through the country and not being able to carry the necessary apparatus, especially a balance, I was therefore obliged to resort to the test by titration, and this test is about as follows: We obtain the cocaine in an aqueous acid solution, about two drams of the solution representing two and one-half grams of leaves. This can now be tested with Mayer's reagent. As the precipitate is formed this precipitate is filtered, and the reagent again added. When no more precipitation occurs we assume that the right amount of reagent has been used, and for every cubic centimeter so used we have eight milligrams of cocaine in the leaves. Now,

estimating by this test in this country the leaves will yield from about one-half to three-quarters of one per cent. of cocaine. As I estimated them in their own country, the leaves being fresh or recently dried, taking an equal weight of fresh leaves, drying them, and then assaying them, I obtained from two to four per cent. of cocaine. I took specimens of the same leaves which I had thus assayed and sent them to the United States, where they were assayed and they yielded the same amount which they are said to yield in this country, namely, from one-half to three-fourths of one per cent. It was evident that I had made a mistake in my process or that the composition of the leaves was very different in their own home. On my return to La Paz for the second time I made a very elaborate series of experiments, looking towards the assaying of the different parts of the plants. I took the best methods I could, collecting and drying at the proper time of the year, taking into account the age of the leaves, and I found my former results confirmed.

But I found on this occasion that on rendering my solution slightly alkaline and washing it with ether, the ether carried away only the cocaine, which was found to be about three-fourths of one per cent., as in this country. This is then, one of the means of accounting for the difference, an entirely different substance from the cocaine, but producing the same reaction with Mayer's reagent, being left behind in the alkaline aqueous solution. This, then, seems to prove that the composition of the leaves is different in their own home from what it is after they are exported. Certainly those who have read anything on this subject must be aware that the effects alleged to be produced in this country by preparations of the exported leaves are very different from those which have been reported to us from its own home. For three centuries we have been hearing from travelers who have visited that country, some of them among the most eminent scientists like Humboldt, Poeppig, and others, of the wonderful effects which coca produces on the natives, the Indians, who chew it. I can only add my testimony to that which has gone before; it is useless to go over it as you all know about it. Every one has read it fifty times, and every one has read and knows what the physicians of Europe and the United States say about it. Those who have tested the exported leaves have found that they produced no such effects. I think the effects of coca chewing are produced in two ways. In the first place we know that if a man is obliged to put forth a certain amount of exertion it tires him to a certain definite extent. Supposing now that he is suffering some severe bodily pain at the time he puts forth this exertion, his fatigue would be very much greater. Part only of the fatigue is due to the muscular exertion which he makes; the other part must be mainly from the nervous waste which is added to the physical waste. This waste, then, which is produced by the suffering, this nervous waste, could be very easily produced by that most acute of all suffering, namely, long continued hunger. These people seldom have enough to eat. They must carry their food with them, and are unable to carry enough for their long journeys. By the chewing of coca leaves the sensation of hunger is deadened; they are freed from this kind of nervous waste of which I have spoken. This will account in part for the beneficial result of the free use of coca. But only in part. There is besides a kind of stimulation resulting from eating these leaves, entirely different from that produced by cocaine or the preparations of coca as we obtain them here.

MINUTE OF THE COLLEGE MEETING.

The annual meeting of members of the Philadelphia College of Pharmacy was held March 26th, at 3.30 P. M., Charles Bullock, President, in the chair. Twenty members were present. The minutes of the last stated meeting (December, 1887), was read, and on motion adopted. The minutes of the meeting of the Board of Trustees for January, February and March were presented, and by resolution approved. The present being the annual meeting, the reports of the standing, or permanent committees, and the election of officers constituted part of the regular business. The Committee on Publication presented the following report: "The issue of the Journal has been prompt and regular throughout the year. The great competition in the field of pharmaceutical literature makes it very difficult for the Committee to extend the circulation of the Journal as much as is desired. The purely scientific character of the publication does not appear to adapt it to the taste of modern pharmacists, whilst the cost of the limited edition will not permit a reduction in the price of subscription. As long as the Journal maintains its present special character as the medium of scientific labor and research, its circulation will be limited to those who now give it preference. Your Committee fear that the radical change in the kind of material now presented to readers of the current literature on pharmaceutical subjects may at no distant day compel a change of method not however at variance with the strictly dignified standard of the present Journal."

This report led to some interchange of view relative to what should constitute any proposed modification that would better meet general appreciation, and improve the business prospects of the publication.

The Editor's report presents the following statement: "That since the last annual meeting seventy-one original papers have been published in the Journal, and in addition thereto twenty-five papers entitled "Gleanings," or "Abstracts," comprising original translations from "foreign journals," and elaborations of new observations, discoveries, or processes gathered from various sources. Of the original papers twenty-eight were devoted to subjects of *materia medica*, twenty to chemistry, nineteen to pharmaceutical and four to other subjects of general interest. Seven members of the College contributed nineteen papers, and more or less extensive abstracts of twenty-nine theses were contained in fifteen papers. The pharmaceutical meetings have been of considerable interest during the past year; a number of new, interesting and rare specimens were exhibited, and not less than thirty-six papers were read, a goodly number of which related to investigations undertaken in the chemical and pharmaceutical laboratories of the College. Aside from the publications mentioned above various editorials, reports, reviews, varieties, etc., etc., as heretofore have been prepared by the Editor, who is gratified to note the fact that the contributors of original matter have increased in number as compared with some previous years, and he ventures to hope that this valued interest in the Journal will be continued."

The Treasurer of the Publication Committee presented the statistical, and also the financial statement of the business editor, as well as a report of the treasurer of the committee. This report gives, as usual, the business condition of this department of the College. The account of the Treasurer had been audited and vouched. In order to adjust the account and furnish the committee

with the necessary working capital, orders for requisite amounts were, on motion, ordered to be drawn on the Treasurer of the College, and on the Treasurer of the Publication Committee respectively.

The Librarian presented his annual report, in which statement allusion is made to the addition of many useful and valuable books on chemistry, pharmacy, botany, and materia medica, together with many exchanges which are of value. The entire chemical section has been so arranged as to make the reference and text books more accessible. Appended is a financial statement showing small balance due the Librarian.

The foregoing statements or reports were all upon resolution received and directed to be placed in full upon the minutes.

The committee on deceased members, through Mr. W. Procter, referred to the recent death of Alfred Tatem, a member of the College elected in 1858. A suitable memoir will be subsequently submitted for publication.

The Treasurer reported the names of several members in arrears of annual dues, ranging from five to seven years. On motion, however, it was decided to postpone action for the present. Under Article 18, of the By-Laws on membership, delinquents are liable to forfeit membership, and have their names stricken from the roll.

On a motion to proceed to an election of officers for the ensuing year, the names of the following gentlemen were placed in nomination:

For President, Chas. Bullock; 1st Vice President, Robt. Shoemaker; 2d Vice President, Wm. J. Jenks; Corresponding Secretary, Dr. A. W. Miller; Recording Secretary, Wm. B. Thompson; Editor, John M. Maisch; Librarian, Thos. S. Wiegand; Curator, Jos. W. England; Publication Committee, Chas. Bullock, Henry N. Rittenhouse, T. S. Wiegand, James T. Shinn, and John M. Maisch, Editor.

For Trustees for the term of three years, Wm. B. Webb, Gustavus Pile, and Wallace Procter.

There being no opposition, a resolution was offered directing that an affirmative ballot be cast, whereupon the gentlemen named were declared duly elected to their respective positions.

No other business being presented a motion to adjourn prevailed.

WILLIAM B. THOMPSON,
Secretary.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, March 15th, 1888.

The annual commencement of the College having been arranged for the 20th day of this month, which this year occurs upon the third Tuesday, it was thought advisable to hold the pharmaceutical meeting a few days earlier; and Dr. Rusby, of the Columbia College, New York, having kindly agreed to lecture upon the Brazillian Forests and their products, it was announced by card that he would do so. This was prevented, however, by the terrible storm, which prevented travel on almost all the roads of the Atlantic States. President Bullock being present took the chair. The minutes were read and approved. Mr. Joseph W. England exhibited a specimen of *Methylic Alcohol*,

which had been employed largely for liniments, for making of varnishes, and as a solvent; it being 70 or 80 cents a gallon cheaper than ethylic alcohol, it was thought worthy of notice. Inquiry was made whether it was useful in making solid and fluid extracts, but no experiments could be reported. Professor Maisch asked whether it was as good a solvent for oils as ethylic alcohol, and it was stated to be equally well adapted to that use. It was stated that the British government, after granting a patent for the method of purifying it, prohibited its manufacture in the pure state, as it could be used for making intoxicating drinks, and defrauding the revenue.

Mr. England exhibited a specimen of *pure Chromic Acid*, and stated that the pharmacopœial requirements were not quite correct; that a pure acid was not deliquescent, and that the crystals had a blackish steel lustre, quite apparent in the general crimson shade of color peculiar to it. Prof. Maisch thought that its deliquescence, as usually seen, was owing to the contaminating sulphuric acid remaining from the method of preparation, and from the drying of the crystals upon absorbent tiles. Mr. Bullock said it could be largely freed from sulphuric acid by drying the crystals, after draining them, upon bricks, previously heated till unpleasant to handle them. In this way a very dry, and but little deliquescent acid could be had.

Mr. England called attention to the subject of *Blaud's Pills*, an improved formula for which he presented (see page 173.)

The reading of the paper caused considerable remarks. Mr. McIntyre said he tried every formula for these pills which he had noticed, and that one published some years since in the JOURNAL OF PHARMACY was very satisfactory.

Prof. Maisch said that when ferrous sulphate and potassium carbonate were well rubbed together, a soft mass containing ferrous carbonate and potassium sulphate was formed, and with the addition of a little tragacanth and simple syrup, yielded a very good pill mass, as he had shown in a paper published in the JOURNAL in 1871 (see page 307.) The presence of sugar would be a guard against oxidation.

Mr. England exhibited some prescriptions, which excited some comment from the very indistinct manner in which they were written. After some further conversation, the meeting adjourned.

T. S. WIEGAND,
Registrar.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

Philadelphia College of Pharmacy.—During the past session of 1887-'88 the customary junior examinations were held November 12th and December 10th, closing with the examination, which took place February 11th. The questions at these several examinations in the different branches were as follows:

BOTANY AND MATERIA MEDICA.

1.—Define *parenchyma* cells, *prosenchyma* cells, and *ducts*; name some of the varieties of each, and explain the same by descriptions and drawings.

2.—What is a *root*? How does the root grow in length? In what manner does this length-growth differ from the length-growth of the stem?

3.—Explain the nature of a *closed* and of an *open fibrovascular bundle*. Describe the *arrangement* of fibrovascular tissue in stems of monocotyledons and of dicotyledons. Name some officinal overground or underground stems of monocotyledonous and of dicotyledonous plants.

4.—Describe and illustrate by diagrams the formation of a one-celled ovary from one carpel; of a one-celled ovary from two or more carpels; and of a several-celled ovary,—indicating in each case the position of the placenta. Name some officinal flowers or flower-buds having one-celled ovaries, and others with a several-celled ovary.

5.—Describe the following officinal flowers: *Chamomile*, *German Chamomile*, and *Arnica*, giving for each: the botanical name and the habitat of the plant; also the characteristics of the involucre, the receptacle, the ray florets, the disk florets, and the pappus.

6.—Give the botanical characters of the order of *Gentianaceæ*. Name some plants of this order yielding officinal drugs. What are the medical properties of these drugs?

THEORY AND PRACTICE OF PHARMACY.

1.—What is the specific gravity of the liquids having the following weights, one fluid ounce of each weighing respectively 569·6 grains, 373·6 grains, 6151·9 grains.

2.—State the sources and give briefly the method of producing illuminating gas; describe the structure of an ordinary illuminating gas flame; state what modifications are necessary in pharmaceutical heating apparatus, to convert an illuminating flame into a smokeless one; illustrate the answers by such drawings as may be necessary.

3.—State the objects of comminution. What is meant by pulverization by intervention? Illustrate by three examples.

4.—How may immiscible liquids be separated? Show either by drawing a sketch, or by writing a description, two forms of apparatus used for this purpose.—How may volatile liquids be separated which are soluble or miscible with each other? Name and describe several forms of apparatus used for this purpose.

5.—Describe the process of *Repercolation* as applied to fluid extracts, and state its advantages and disadvantages for general use by pharmacists.

6.—How is *Nitrate of Silver* made? What are its physical properties and uses in medicine? In what forms is it used externally? Give the officinal titles of the three forms of this salt.

CHEMISTRY.

1.—What is a *thermometer*? What are the two thermometer scales used in the U. S. Pharmacopœia? Explain the difference between them. Convert 39° C. into F. reading; convert 12° F. into C. reading.

2.—In what ways may *electricity* be generated? How may electricity be converted into heat, how into light, how into magnetism? Give examples. What differences exist between frictional electricity and that developed by chemical action?

3.—Write the formula of a haloid acid; of an oxygen acid; of a metallic hydrate. Write the formula of a monobasic acid; of a dibasic acid. Write the formula of an acid salt; a neutral salt; a basic salt.

4.—Write two reactions for the generation of hydrogen. Mention two experiments illustrating the affinity of hydrogen for oxygen.

5.—Describe the officinal varieties of *sulphur*. Give the formulas and names of the *acids* which contain sulphur. Give the formula of an officinal *salt* of each of these acids.

6.—Write two reactions for preparing *carbon dioxide*. Write one reaction for preparing *carbon monoxide*. Describe these two oxides.

QUESTIONS BY THE EXAMINING COMMITTEE.

1.—What effect has rise in temperature on the specific gravity of liquids? Why is this effect produced? Describe the form of apparatus for taking specific gravity most used for hot liquids.

2.—Give the botanical name, natural order, and habitat of the plant which yields *Sambucus*. Name and illustrate by diagram the form of inflorescence, and describe the flowers.

3.—Describe four methods of producing crystals; give an example of crystals obtained by each method.

4.—How many volumes of hydrogen are required to combine with ten volumes of chlorine? How may chlorine and hydrogen be caused to combine? Describe how the physical and chemical properties of the resulting compound differ from those of the two elements composing it?

5.—What is the weight of a gallon of an aqueous solution of boric acid, the specific gravity of which is 1.015? Put all of the figures used in your calculations on the examination paper. How much boric acid is contained in a gallon of the above solution, if it is made in the proportion of 1 grain of the acid to 24 grains of water?

SPECIMENS.

<i>Cetraria.</i>	<i>Aqua Amygdalæ amaræ.</i>	<i>Alumen.</i>
<i>Aurantii flores.</i>	<i>Syrupus Ferri iodidi.</i>	<i>Magnesi sulphas.</i>
<i>Lobelia.</i>	<i>Extract. Erythroxyli fluid.</i>	<i>Sodii bicarbonas.</i>
		<i>Liquor Sodæ chloratæ.</i>

OPERATIVE PHARMACY.

1.—Percolation of six ounces of Ground Gentian with one pint of water.

2.—Preparation of Solution of Tersulphate of Iron.

3.—Preparation of Ointment of Nitrate of Mercury.

The re-examination of those junior students who failed in the February examination in one or more branches will be held on Friday September 28th at 3.30 o'clock P. M.

The examination of the *senior students* commenced on Saturday February 25th, and closed on Thursday March 1st, with the examination in operative pharmacy and analytical chemistry, as follows:

MATERIA MEDICA AND BOTANY.

A.—Stillingia.—Give the botanical name, the natural order, and the habitat of the plant. Describe the physical characters and the structure of the drug. What constituents does it contain? What are its medical properties; and in what doses is it used? Name some other drugs obtained from the same natural order, and state the medicinal dose of each.

B.—Golden Seal.—Name the plant, its natural order, and its habitat. Describe the physical characters of the drug, and its structure, and give its medicinal properties and its dose. Give the outlines of a process for isolating the two alkaloids, and mention some of the properties of each alkaloid.

C.—Arbor Vitæ.—Name the plant, its natural order, and its habitat, and state which part of the plant is officinal. Describe the drug, and mention its proxi-

mate constituents, giving also some characteristics of the more important principles. What are the medical properties and the dose of the drug? How may the drug be distinguished from *savine*?

D.—Yellow and Red Cinchona.—Give for each drug the botanical name of the tree, the country where each is indigenous, and the altitude of the native distribution of each tree. Describe the two drugs, dwelling more particularly upon the characteristic differences of their physical appearance and structure. Mention the structural characteristics of cuprea bark.

E.—Eucalyptus.—Give the botanical name, the natural order, and the habitat of the tree. Describe the drug, and also its important constituent. Name other plants of the same natural order, and state in each case which parts of these plants yield officinal drugs.

F.—Cubeb.—Name the plant, the natural order, its native country, and the time of collection of the drug. Describe the drug, and point out the differences from officinal drugs of similar size and appearance, and from false cubeba sometimes met with. What is the percentage of the chief medicinal principles of cubeba, and what are the medical properties of these constituents?

G.—Seeds with curved embryo.—Name the pharmacopœial seeds having a curved embryo, and state in each case whether the seed contains albumen (perisperm) or not; also give for each seed the principal constituents, some of the characters of the medicinally important principles, and the medicinal dose of each seed.

H.—Saffron.—What is saffron? From what plant and from what natural order is it obtained? Describe the drug in the state of purity, and mention its proximate constituents. Enumerate the different substances used for adulterating saffron, and state how each adulterant differs from saffron, and how it may be detected.

I.—Lactucarium.—Name the plant, and state when and how lactucarium is prepared. Describe the drug, and indicate the effect of simple solvents upon it. What proximate principles does the drug contain? Which of these principles have a bitter taste, and what effect have al¹—ies upon them? Give the medical properties and the dose of lactucarium.

K.—Give the characteristic reactions of the following proximate principles: *Quinine; Hyoscyamine; Colchicine; Meconic Acid; Gallotannic Acid.*

THEORY AND PRACTICE OF PHARMACY.

A.—A wholesale druggist desires to use five pint bottles for sending out the following liquids, *Commercial Chloroform, Glycerin, Solution of Chloride of Iron.* Show by a specific gravity calculation, (putting down all the figures), how many avoirdupois pounds he would put in each, after allowing an air space equal to half a pound in each.

B.—Give the unabbreviated officinal names, ingredients, brief outlines of process and describe the appearance of *Donovan's Solution, Fluid Extract of Senna, Syrup of Wild Cherry, Tincture of Ignatia, Compound Decoction of Sarsaparilla, Vinegar of Squill, Iodized Starch.*

C.—Give the English names, ingredients, brief outlines of process, and describe the appearance of *Extractum Taraxaci, Vinum Rhei, Infusum Digitalis, Emplastrum Opii, Tinctura Ferri Chloridi, Massa Hydrargyri, Aloe Purificata.*

D.—Give the reasons for the following—Why is *Soap* used as an excipient in making officinal pills containing aloes?

What was the object of introducing *Stronger White Wine* into the Pharmacopœia?

Why is *Glycerin* used in the menstrua for exhausting the fluid extract and tinctures of *Cinchona*?

Why is the deposit which separates from *Oleoresin of Aspidum*, U. S. P., directed to be thoroughly mixed with the liquid portion before use, whilst in *Oleoresins of Cube and Pepper*, U. S. P., the deposits are to be rejected? Give the names of the deposits in each case.

Why is Hydrochloric Acid added to Nitrate of Silver in making official moulded Nitrate of Silver?

How may the deposit likely to occur in galenical preparations made from fleshy roots, be prevented?

E.—What is a *Stearopten*? Describe the *Stearopten* obtained from Oil of Peppermint. What is the best solvent for it when it is to be applied by inunction? What is the chemical composition and method of production of two volatile oils obtained from Lavender? Name the official preparations into which they enter.

F.—How is *Deodorized Tincture of Opium* made? What are its advantages over Tincture of Opium? Name the principal acid found in Opium. What tests are used to prove its identity? Name the most unstable official Salt of Morphine, and give reasons for its instability. What addition is usually necessary to perfect its aqueous solution?

G.—Define natural emulsions; what is the cause of their opacity? How are they imitated in pharmacy? Under what circumstances is *Acacia* sometimes added to prescriptions by pharmacists when it is not especially directed by the physician?

H.—Examine the following prescriptions, and state whether you would dispense them; how would you proceed?

R Acid. Nitro-mur. Dil..... f 3 ij
Ext. Chiratae Fld..... f 3 ii
Ext. Gelsemii q. s. ft..... f 3 ij
Sig.—A teaspoonful after meals.

R Morph. Sulph..... gr i
Argenti Oxid..... gr xx
Ext. Gent. q. s.

Ft. mass. et div. in pil. No. xx.
Sig.—One at bedtime.

R Ext. Coloc. Comp..... gr xx
Ext. Hyoscyam..... gr xxx
Res. Podophylli gr xxx
Ft. massae et div. in pil. No xx.
Sig.—One at bedtime.

I.—How should the following be dispensed? Should they be filtered? Criticize, give reasons.

R Tinct. Nuc. Vomicae..... f 3 i
Tinct. Cinchon. Comp..... f 3 ij
Muc. Acaciae f 3 iv
Sig.—A teaspoonful 3 times a day.

R Tinct. Opii..... f 3 iv
Tinct. Krameria f 3 ij
Aque Camphorae.....
Aque Menth. Pipad f 3 iss

Sig.—A teaspoonful as required.

R Plumbi Acet..... gr xv
Zinci Acet..... 3 ss
Tr. Catechu..... f 3 i
Tr. Opii..... f 3 ij
Pulv. Acaciae 3 ij
Aque.....ad f 3 viij
Sig.—Use as directed.

K.—Translate the following, giving the unabbreviated English names of the ingredients, and state whether they should be dispensed; if so, how?

R Hyd. Chlor..... 3 i
Liq. Mag..... f 3 i
Liq. Pot. Cit.....ad f 3 viij

Sig.—Add one powder to a cupful of water and use as a wash.

R Pulv. Alum..... 3 ss
Sacch. Saturni gr xx
M. ft. pulv. div. in chart. no vj

R Emp. Canth..... no i
Sig.—Apply behind left ear—Draw a diagram of this plaster showing proper shape, size and margin.

CHEMISTRY.

A.—Describe *Bromum* and *Iodum*. What are the present sources of each of these elements, and how are they extracted? Give the chemical formulas of three official Bromides and of three official Iodides.

B.—State how the following common Inorganic Acids are made, and write the chemical reactions in each case: Hydrochloric Acid, Nitric Acid, Sulphuric Acid, Phosphoric Acid, Carbonic Acid.

C.—What is "*Chili Saltpetre*?" What are some of the uses to which it is applied in manufacturing chemistry? What important official substances are made or extracted from it? Would common Saltpetre do as well in these cases? State reasons for your opinion.

D.—Give the formulas of *Bismuthi Subcarbonas* and *Bismuthi Subnitras*. What would be the formulas of the Normal Carbonate and Normal Nitrate? By what means is the Normal Nitrate changed into the Subnitrate? What is the formula of the Subiodide of Bismuth? What of the Normal Iodide?

E.—Give the chemical formulas of *Ferri Chloridum*, *Ferri et Ammonii Sulphas*, *Ferri Hypophosphis*, *Ferri Lactas*, *Ferri Oxalas*, *Ferri Oxidum Hydratum*, and *Ferri Sulphas*. State which are ferrous compounds and which are ferric. By what tests can you distinguish ferrous from ferric salts?

F.—Give the chemical formulas of *Chloroformum* and of *Chloral*. To what classes of organic compounds do they belong respectively? State how each of them is obtained, the materials used and the process of manufacture. Describe the properties and state the tests for each.

G.—What are the conditions of the *Acetous Fermentation*? Write the chemical reaction for it. How is most of the Acetic Acid of commerce made? What are some of the bye products? How is the crude acid, so obtained, purified?

H.—What is the general composition of the vegetable and animal *fats*? What difference in chemical composition between Olive Oil and Beef or Mutton Suet? What between Olive Oil and Linseed Oil? What pharmaceutical and technical products can be obtained from Suet, Olive Oil and Linseed Oil, respectively?

I.—State the chemical formula and official name of Tartar Emetic? Give the chemical formula and official name of Cream of Tartar? Give the chemical formula and official name of Rochelle Salt? State the distinctive tests for each of these three compounds.

K.—Define a Phenol, an Aromatic Aldehyde, and an Aromatic Acid, and give official examples of each class. What are Phenol-Acids? What two official compounds belong to this class? Which of these is made artificially? Give the chemical reactions for its synthetic production.

EXAMINING COMMITTEE.

A.—In what forms is Carbon official? Give a description of each of these varieties, with mode of preparation and pharmaceutical and medicinal uses.

B.—What is the official name of Saltpetre? From what source is it obtained? How is it made? Describe its appearance, shape of crystal, and give its chemical formula. Does it contain water? If so, in what form? What are the medicinal properties of Saltpetre and the usual dose? What is *Sal Prunelle*?

C.—Give the botanical name, natural order and habitat of the plant from which Balsam of Tolu is obtained. Briefly describe the Balsam and the method of its preparation. Give the unabbreviated official names of the preparations into which Balsam of Tolu enters. Name, and give the chemical formulas of the acids found in Balsam of Tolu. Name two or more other official drugs containing either of these acids. From what substances, and how may these acids be artificially prepared.

D.—What is the official name of Gun Cotton? Give its mode of preparation. What is its chemical name? What official preparations are made from it, and how are they prepared?

E.—Give two tests to distinguish *Mercuric* salts from those of Bismuth. How would you prove the presence of *Bromide of Potassium* in *Iodide of Potassium*? A solution contains *Phosphates* and *Arsenates*. How would you detect them?

F.—What is the official name of Tully's powder? Give its mode of preparation, proportions of active ingredients, and medium dose. What is the official name of Compound Powder of Jalap? Give the proportions of its ingredients. What is the official name of Aromatic Powder? Name its ingredients, omitting quantities. What is the official name of Seidlitz Powders? Name the ingredients and quantity of each which enters into its composition. What is the official name of Compound Powder of Rhubarb? Name its ingredients, omitting quantities.

G.—1.—If 540 grammes of Mercury are added to 50 c.c. of water contained in a 100 c.c. graduated tube to what cubic centimetre division will the level of the water rise?

2.—A piece of silver sp. gr. 10.5 loses 184.7 grammes when weighed in a certain official liquid. What is the liquid if the weight of the silver is 1050 grammes? Give all the figures used in obtaining the results.

H.—Name the ingredients which enter into the composition of Compound Syrup of Sarsaparilla. Give the botanical name, natural order, habitat and official portion of the plants yielding the *solid* constituents thereof.

I.—How should the following prescriptions be compounded?

1.-R Lithargyri..... 3 x
Ol. Olivæ..... 3 v
Ol. Lavandulæ..... ʒ xl
M. ft. unguent.

2.-R Ol. Amygdal.....
Glycerini.....aa f 3 i
Mucilag. Acac..... f 3 ss
Syr. Aurantii Cort..... f 3 ss
Liquor. Calcis..... f 3 i
Aque.....ad f 3 viij

Describe the appearance of the following and state how they should be dispensed.

3.-R Quininæ Bisulph..... 3 ss
Mist. Bashami..... f 3 iv
M—Sig.—Teaspoonful 3 times a day.

4.-R Quininæ Sulph..... ʒ i
Tr. Ferri Chlor..... f 3 i
Acid. Sulph. Dil..... q. s.
Aque.....q. s. ft. f 3 ij
M. ft. mist. sec. art.

K.—How should this be compounded?

R Ext. Coloc. C..... 3 j
Hyd. Chlor. Mit..... gr vj
Tinct. Capsici..... gtt xl
Ft. mass. et div. in pil. No xii.

R Magnes. Carb..... gr xx
Potass. Bicarb..... 3 i
Vin. Ipecac..... gtt xx
Syr. Simp..... f 3 iij
Aque..... f 3 vj

Sig.—A teaspoonful every 4 hours.

How should this be compounded and dispensed?

R Bals. Peru..... 3 i
Liq. Plumbi Subacet. Dil... f 3 v

Sig.—Apply as a lotion.

Criticize and write out an explanation of method of compounding this:

R Hyd. Chlor..... gr v
Ext. Opii..... gr ij
Aque..... f 3 ij
fiat lotio

Sig.—Let a drop be placed in the eye every hour.

Should this be filtered, and is it a safe dose for an infant 5 months old?

SPECIMENS.

<i>Materia Medica.</i>	<i>Pharmacy.</i>	<i>Chemistry.</i>	<i>Committee.</i>
Gelsemium.	Aqua Creasoti.	Acid. Sulphuros.	Cornus.
Calamus.	Mistura Amygdalæ.	Acidum Citricum.	Myrrha.
Dulcamara.	Mist. Glycyrrhizæ comp.	Potassii Nitræs.	Potassii Carbonas.
Gossypii rad. cort.	Syrupus.	Potassii Chloras.	Plumbi Oxidum.
Digitalis.	Tinct. Lavand. comp.	Potassii Bitartras.	Liquor Calcis.
Sambucus.	Ext. Erythroxylî fluid.	Sodii Boras.	Liquor Ammonii acet.
Anisum.	Extract. Gentianæ.	Sodii Salicylas.	Tinctura Myrrhæ.
Nux vomica.	Glyceritum Amyll.	Liq. Sodæ Chloratæ.	Tinct. Valerianæ Ammon.
Resina.	Cinchoninæ Sulphas.	Magnesi Carbonas.	Syrupus Pruni Virginian.
Coccus.	Ferri Sulphas Exsicc.	Zinci Sulphas.	Extract. Sennæ fluid.

OPERATIVE PHARMACY.

- 1.—Prepare granulated Salicylate of Sodium.
- 2.—Prepare four fluid ounces of Compound Mixture of Iron by the U. S. P. process.
- 3.—Make four fluid ounces of a 50 per cent. Emulsion of Cod Liver Oil with distilled water, using equal parts of dextrin and gum to emulsify the oil, and put an extra label on the bottle, giving the exact formula used.
- 4.—Make Emplastrum Belladonnæ, using extr. bellad. gr. lx; resin gr. cxx; yellow wax, gr lx, and lead plaster, 3 ij.
- 5.—Spread a Belladonna Plaster 4x6 inches.

ANALYTICAL CHEMISTRY.

Official salts or mixtures of salts, in the state of powder or in aqueous solution were given for qualitative examination.

The competitive examination of microscopic specimens of drugs for the J. M. Maisch prize, offered by Mr. J. H. Redecker, took place March 13th. Fifteen candidates were entitled to participate, they having attained the grade very satisfactory in the examination in materia medica, specimens included. Owing to absence from the city and to the delay of the mails in consequence of a heavy snow storm, only seven of the candidates were present. The final competition was between Messrs. W. H. Clark and J. E. S. Bell. The specimens prepared for examination were: Cinnamomum zeylanicum, Cinchona lancifolia, Dulcamara, Veratrum, Anisum, Aspidium, Aurantii Cortex, Caryophyllus, Amylum Marantæ, Ipecacuanha, Calamus, Cascarilla, Carum, Sarsaparilla, and Frangula.

The names of candidates who had not fully complied with all the requirements for graduation, but had passed the examinations in all the branches, will be reported to the Board of Trustees at a subsequent time. The following list comprises the names of all the successful candidates, including several holding over from last year, entitled to receive the degree of Graduate in Pharmacy (Ph. G.), also the subjects of their theses.

GRADUATING CLASS.

Ella Amerman, Pennsylvania, Anthemis nobilis.
Joseph Sleifer Angeny, Jr., Pennsylvania, Cascarilla sagrada.
Harvey Franklin Backenstoe, Pennsylvania, Advantages of Pharm. Manufacturing.

Robert Baird, New York, Ichthyocolla.

John H. Bear, Pennsylvania, Aromatic Syrup of Rhubarb.

James Webb Beckwith, New York, Menstruum for Apocynum.

James Edgar Stevenson Bell, California, Examination of the Adulteration of Commercial Peppers.

Charles William Bippus, Ohio, Tabacum.

Charles Edgar Black, Ohio, Decoration of Drug Store Windows.

Ira Linton Bond, Pennsylvania, Calendula officinalis.

Charles Alfred Bowen, New York, The Relation of the Pharmacist to the Physician.

Charles Henry Breidenbach, Ohio, Gum Kino.

William Brewer, New Jersey, Radix Cnicifugæ.

James Hicks Bunting, North Carolina, Euphorbia pilulifera.

William Henry Campbell, Pennsylvania, Soap.

Charles Walton Cannon, Delaware, Bases for Iodine Ointment.

Sherman Lincoln Carroll, Pennsylvania, Salicylate of Cinchonidia.

William Henry Clark, New York, Grindelia Robusta and Grindelia Squarrosa.

Albert Cliffe, Pennsylvania, Antiseptics.

Fred'k Frélinghuysen Coleman, New Jersey, Elegant Pharmacy Introducing Elixirs.

Martin Payne Crawford, Pennsylvania, Disinfectants.

William Crutcher, Kentucky, Helianthemum canadense.

Walter Culin, Pennsylvania, Solution and Tincture of Chloride of Iron.

George Altick Curriden, Pennsylvania, Potassii Iodidum.

Clayton Erwin Davis, Massachusetts, Silk.

John Stephen Voorhies Davis, Delaware, The most important element.

Henry Elias Dehler, Ohio, Emplastrum fuscum.

Charles Ellsworth Dyer, Kansas, Emplastra.

Robert Isam Eads, Kentucky, Iodides of Mercury.

Charles Born Evans, Pennsylvania, Fluid Extract of Blackberry.

Oscar George Fegley, Pennsylvania, Qualitative Analysis.

Frederick William Franz, Iowa, Oil of Pennyroyal.

Paul Herman Gallashick, Pennsylvania, Examination of Red Clover.

Charles Sumner Gallaher, Wisconsin, Cassia nictitans.

Edward Harry Gingrich, Pennsylvania, Terebene.

Charles Wellington Green, Pennsylvania, Erythroxyton Coca.

Philip Henry Green, Pennsylvania, Apis mellifica.

Lucian Alfred Gros, California, Cnicifuga racemosa.

John Joseph Haley, Pennsylvania, Hyocyamus.

William Henry Hanson, Pennsylvania, Sieve and its Appliances.

Thomas Harold Hazel, Pennsylvania, Sulphuris Iodidum.

William Frederick Hebsacker, Pennsylvania, Oxide of Zinc.

Harry Baker Heffley, Pennsylvania, Grindelia robusta.

William Clow Hepler, Pennsylvania, Amylum.

Sherman Francis Hennessy, Pennsylvania, Lycopodium virginicum.

August Rudolph Hesse, Pennsylvania, Solution of Citrate of Magnesium.

Thomas Hetherington, Pennsylvania, Pharmacy.

Wesley Jackson Hibberd, Pennsylvania, Green Iodide of Mercury.

Aquila Hoch, Pennsylvania, Theobroma Cacao.

- Ludwig Holtzhauser, Germany, Suppositories.
Sydney Lee Hooper, Pennsylvania, Lactucarium.
Henry Taylor Hoover, Pennsylvania, Donovan's Solution.
Eugene Jacob Jacobs, Georgia, Cotton Seed Oil.
Claude Grant Johnson, Maryland, Bromates of the Cinchona Alkaloids.
Frederick Leighton Johnson, New Jersey, New Process for Manufacture of Sugar from Sorghum.
Wm. Arthur Sterling Johnson, Canada, Potato Starch.
Lysander Mann Jones, Pennsylvania, Analysis of Market Jellies.
William Carroll Jones, New Jersey, Podophyllum peltatum.
William Charles Kaltever, Texas, Dioscorea villosa.
Frederick Franklin Kappes, Ohio, Pepsinum.
Charles DeWalt Keefer, Pennsylvania, Aspidium marginale.
Charles Elmer Keeler, Pennsylvania, Scientific Pharmacy.
William George Keir, Pennsylvania, Glycerin.
William Kuder, Ohio, Caffeine Estimation.
Louis John Lehman, Illinois, Lanolin.
Oliver Franklin Lenhardt, Pennsylvania, Eriodictyon californicum.
Harry Lippen, New Jersey, Rhamnus Purshiana.
William Hall Ludlam, New York, Corrosive Sublimate.
Albert James Lynch, Canada, Analysis of Milk.
George Lyons, Pennsylvania, Hydrogen Peroxide.
Robert Wesley Madeira, Pennsylvania, Ozone and its Properties.
John Aj May, Iowa, Pharmacy and Pharmacists.
Leslie Corwin McClellan, Colorado, Chimaphilla umbellata.
Berthier McClure, Pennsylvania, Corydalis.
Thomas Francis McCoy, Pennsylvania, Acidum hydrocyanicum dilutum.
Frederick William Meissner, Jr., Indiana, Gallic Acid.
Harry Joseph Meyers, Pennsylvania, Emulsion of Oil of Chenopodium.
William Christian Miintzer, Indiana, Estimation of glycyrrhizin in Extract of Licorice.
Thomas Frank Moody, Georgia, Assay of Benzoin.
John Louis Dales Morison, New Jersey, Conversion of Calomel into Corrosive Sublimate by Chlorides.
Frank Gereon Mumma, Pennsylvania, Calendula officinalis.
Frank Edward Murphy, Missouri, Diospyros.
Charlie Bodine Neal, New Jersey, Pills and Excipients.
Henry Augustus Selle Nolte, New Jersey, The New Pharmacy Law.
Albert Eugene Oerter, Pennsylvania, Liquor Ferri Chloridi.
Howard Thatcher Painter, Pennsylvania, Pycnanthemum linifolium.
Joseph Alphonse Palen, Iowa, Rus glabra.
Edward Montague Platt, Pennsylvania, Medicinal Plants of Franklin Co., Pa.
Henry Augustus Charles Poppenhusen, Missouri, Apocynum cannabinum.
James Maxwell Pringle, Jr., South Carolina, Tobaccp.
Otto Prochaska, Ohio, Weidemeyer's Cure.
John Herman Rabenau, Pennsylvania, Guaiac Resin.
Wilbur Fisk Rawlins, Delaware, Magnolia.
John Rea, Pennsylvania, Maydis Stigmata.
Albert Henry Roshrig, Pennsylvania, Elixirs.

- Gustave Rosen, Kentucky, Hints on Dispensing of Poisons.
 William Clymer Rowe, Pennsylvania, Iodum.
 David Stephen Ryan, Pennsylvania, Arsenious Acid.
 Charles Rinear Scattergood, New Jersey, Amylum.
 Herman John M. Schroeter, Wisconsin, Cassia marilandica.
 George Robert William Schuster, D. C., Official Troches.
 William James Scott, Pennsylvania, Saccharum officinarum.
 Otto Seiffert, Iowa, Plumbi Carbonas.
 Frank Morris Siggins, Pennsylvania, Gingers and their Comparative Values.
 Howard Melancthon Smith, Pennsylvania, Examination of Prepared Chocolates.
 John Rieman Smyser, Pennsylvania, Syrup of Ferrous Bromide.
 Bertram Snyder, Pennsylvania, Cantharis vesicatoria.
 Henry Nissley Snyder, Pennsylvania, Drosera rotundifolia.
 William Lincoln Snyder, Ohio, Hydrogen Peroxide.
 George Reed Souder, New Jersey, Materia Medica and Pharmacy.
 Owen Crow Spear, Delaware, Hunter's Toilet Powder.
 Albert John Staudt, Illinois, Moss Mucilages.
 William Stengelin, Pennsylvania, Unguentum Aquæ Rosæ.
 Mims Baker Stone, Alabama, The Importance of Dietetics.
 Charles Clark Stratton, New Jersey, Blue as an Adulterant in Sugar.
 Frank Park Streeper, Pennsylvania, Extract of Pinus Canadensis.
 Charles Michael Swartz, Pennsylvania, Cubebs.
 Luin Burt Switzer, New York, Fluid Extract of Cascara sagrada.
 Gove Saulsbury Taylor, Maryland, Spigelia.
 Thomas Clarkson Taylor, Delaware, Celluverte.
 J. Walton Travis, New York, Fluid Extract of Stavesacre.
 Emil Joseph Uller, Pennsylvania, Pilocarpus pennatifolius.
 Robert Sydney Wagner, Pennsylvania, Pills and Pill Excipients.
 Louis Waldenberger, Pennsylvania, Suppositories.
 Edwin Corby Wallace, Ohio, Fermentation.
 Frank Brisben Wallace, Kansas, Benzoic Acid.
 Frank Walls, Delaware, Nitroglycerin.
 Lucius Ledom Walton, New Jersey, The Natural System.
 Frederick George Wedemeyer, Germany, Petroleum.
 Frank Bessler Weiser, Pennsylvania, Pilea pumila.
 George Victor Wenner, Pennsylvania, Tartaric Acid.
 William Jacob Weyand, Pennsylvania, Process for the Detection of Arsenic, Antimony and Mercury in Organic Mixtures.
 William John Williams, Pennsylvania, Ammoniated Mercury.
 John Thomas Wrigley, Pennsylvania, Tinctures.
 Maxwell Wyeth, Pennsylvania, Critical Review of Fluid Extracts.
 Philip Wayland Young, Pennsylvania, Calcite.
 James Stewart Zane, New Jersey, Chemistry and How Chemical Analyses are Made.

The graduating class, invited by the faculty, assembled in the museum of the college building on the evening of March 19th, and spent a few hours in pleasant intercourse with the officers and trustees of the college. Mr. Bell on behalf of the class presented to the college a Thomson hand-dynamo,

which was at once put in operation in illustration of some of the uses to which the machine may be put. The gift was accepted by President Bullock who in his remarks dwelled upon some of the American contributions to physical science, and more particularly to electricity. The commencement exercises took place at the Academy of Music on the evening of March 20th, when the president of the college, Charles Bullock, conferred the degree of Graduate in Pharmacy upon the above named candidates, and subsequently the degree of Master in Pharmacy—*honoris causa*—upon Wm. J. Jenks of class 1842, Thos. S. Wiegand of class 1844, and Jos. P. Remington of class 1886. A certificate of Proficiency in Chemistry for special chemical studies was granted to Wayland P. Young, Ph. G. The Procter medal for highest grade of scholarship and meritorious thesis was awarded to William Crutcher, of Louisville, Ky.; and honorable mention to the following with the grade "distinguished:" Ella Amerman, Claude G. Johnson, W. A. S. Johnson, Wm. C. Kalteyer, J. L. D. Morison and H. J. M. Schroeter; and with the grade "meritorious:" J. E. S. Bell, Wm. H. Clark, E. J. Jacobs, O. F. Lenhardt, F. E. Murphy, F. P. Streeper and L. L. Walton. The Henry C. Lea Prize, \$100, for most meritorious work in connection with the graduating dissertation was equally divided between Wm. H. Clark and L. C. McClellan, the presentation being made by the secretary of the college, Wm. B. Thompson. The professors' prizes were bestowed as follows: the *Materia Medica* prize, a Zentmayer microscope, for original histological work on American plants, to L. C. McClellan, with honorable mention of C. D. Keefer; the Pharmacy prize, a gold medal, for original pharmaceutical work to G. R. W. Schuster, with honorable mention of W. H. Hanson; the Chemistry prize, a chemical balance, for original quantitative analysis, to F. W. Franz, with honorable mention of W. H. Clark, H. J. M. Schroeter and W. F. Rawlins; and the Analytical Chemistry prize, \$25, for laboratory work during the preceding year, to H. J. M. Schroeter. Four other prizes were awarded: the John M. Maisch prize, \$20 gold, offered by Mr. J. H. Redsecker, of Lebanon, Pa., for histological knowledge of drugs, to Wm. H. Clark; the Operative Pharmacy prize, \$25, gold, offered by Mr. E. L. Boggs, of Charleston, W. Va., for best examination in that branch, to F. E. Murphy; the Theoretical Pharmacy prize, a prescription balance, offered by Mr. H. J. Maris, of Philadelphia, for best examination in the branch named to Wm. Crutcher; and the Robinson gold medal, offered by Mr. Jas. S. Robinson, of Memphis, Tenn., for best chemical examination, to Claude G. Johnson. Honorable mention was accorded for theory of pharmacy to Ella Amerman, J. L. D. Morison and C. G. Johnson; for operative pharmacy to W. C. Kalteyer, Ella Amerman and J. L. D. Morison; and for the Maisch prize (grade very satisfactory in specimens and questions of *Materia Medica*) to Ella Amerman, J. E. S. Bell, W. Crutcher, G. A. Curriden, T. H. Hazel, A. Hoch, E. J. Jacobs, C. G. Johnson, W. A. S. Johnson, W. C. Kalteyer, O. F. Lenhardt, J. L. D. Morison, H. T. Painter and L. L. Walton.

The valedictory address was delivered by Prof. Sadtler, who discussed the kind of education which truly *educates*, or develops, the thorough pharmacist. It was shown that, as chemistry and *materia medica*, the sciences upon which pharmacy is based, have expanded and become distinct subjects of study and research, the pharmacist's education dare not be simply shop practice, but must include these scientific foundations for correct practice. Nor ought his education be purely or mainly theoretical, it must include with theory a great deal

of practice. The present methods in other branches of learning were referred to, as in medicine and engineering studies. Attention was directed to the facilities offered by this College in its various laboratories and practical classes, and to the widened field opened to the pharmacist through the cultivation of the accessory sciences.

As usual, the exercises opened and were interspersed with music, and closed with the distribution of the floral and other presents sent by friends for a number of the graduates. This custom of the public distribution of friendly presents has rapidly declined of late years, and what little was left of it at the last commencement, might without harm have been confined to the green room.

While during the past winter such improvements were made, as were deemed necessary or desirable in the procuring of additional specimens, apparatus and other means of illustration and instruction, the work in the various laboratories was considerably extended, and in all the facilities for original investigation were increased. In the *chemical laboratory* considerable work was done by advanced students in the analysis of urine, the determination of the purity of articles of food and medicine, elementary analysis, proximate analysis, etc. Besides the class instructions which have been conducted for a number of years in the *pharmaceutical laboratory*, opportunities were offered in this department during the past winter for individual instruction and special investigations, and the results thus far attained afford ground for much encouragement. The field cultivated was not confined merely to subjects selected for theses, but extended to the preparations of the new formulary, to researches on emulsifying agents, pill exipients, menstruums for fluid extracts, extracts, etc., to the determination of the medicinal value of commercial varieties of drugs and to allied topics of practical applicability. In the *microscopical laboratory* the histological study of plant-organs was, as heretofore, cultivated, and the use of the microscope in various practical applications was demonstrated, as in urinary analysis, the identification of certain articles, the detection of impurities and adulterations, etc. This department is still by many students regarded with indifference; but it is gratifying to note the increased attendance at this optional course of instruction, and the greater appreciation, by the earnest student, of the utility and importance of the microscope to the pharmacist.

Of the work done during the past session by the Alumni Association in furtherance of the objects of the College, an account will be found on another page of this journal. The transactions of the College at its *pharmaceutical meetings*, which are held monthly during eight months of the year, have been reported in the Journal regularly every month, commencing with the November issue. These meetings have been attended by many of the students, and a number of them embraced the opportunity afforded them of reporting on subjects investigated by them, or such as had come under their observation.

It should also be mentioned here that on December 1st Dr. H. H. Rusby delivered, before the students, the alumni and the members of the College, a lecture on the cinchonas, coca and guarana, embracing his observations during a sojourn of about two years in South America. Dr. Rusby had gone to South America primarily with the view of ascertaining for Messrs. Parke, Davis & Co., the sources of supply of the many important drugs from that continent, which he crossed from west to east. The expedition, though primarily a mercantile undertaking, being conducted by a scientist, it was natural to expect from it also

valuable scientific results, some of which were embodied in the lecture referred to, a portion of the latter having been published in the "Journal." Arrangements had been made for another lecture early in March by Dr. Rusby, on the forests of Brazil; but the snowstorm, which with unprecedented severity, interrupted or seriously interfered with all means of communication, prevented the consummation of the project at the appointed time.

The New York College of Pharmacy held its fifty-eighth commencement March 28th, at Steinway Hall, ninety gentlemen and two ladies receiving the degree of Graduate in Pharmacy. The recipients of the gold, silver and bronze medals were G. C. Dickman, H. S. Miles and A. Niederer. A. T. Brown was the class valedictorian, and General Wm. T. Sherman delivered an address.

The Buffalo College of Pharmacy held its first commencement in Music Hall February 28th. One lady and eleven gentlemen received their diplomas as Ph. G. A prize of \$50 was awarded to R. Elliott for proficiency in pharmacy, and one of \$25 to W. C. Heussy for deportment and diligence. J. P. Meidenbauer received the junior prize of \$25. Six young men having passed the examinations, will receive their diplomas on becoming of age and completing the required time of service at the drug business.

The Albany College of Pharmacy held its commencement in Agricultural Hall March 6, eleven graduates including one lady receiving the diploma. Prizes were awarded to S. S. Smith and Jas. Gardner, and in the junior class to J. T. Comstock. Valedictory addresses were delivered to the class by Prof. Gilbert of the High School, and on behalf of the graduates by E. L. Gaus.

The Maryland College of Pharmacy, in consideration of the recent death of President Joseph Roberts, and of Professor J. Faris Moore, and at the request of the graduating class, abandoned the usual commencement exercises. The announcement of the graduates was made at the College building on the evening of March 22d. The following list comprises the graduating class: J. E. Albertson, J. M. Atkinson, H. M. Baxley, S. O. Blair, Chas. E. Brack, Jr., Jos. D. Brown, Wm. G. Buschman, B. W. Charsee, Andrew Daiger *, P. H. Dalton, Jr., Wm. Dawson, O. J. Dietz, Eugene Douglass *, Henry G. Dressel *, Louis G. Fernner, Wm. F. Forien, Alfred George, P. C. Hauser, W. J. Hill, G. A. Lankford, Joseph Link, Geo. H. Lippy, Charles A. Luck, Chas. S. Maschal, Jas. W. Modena *, Henry O. Reik, S. T. Roeder, Jr., Wm. Scherer *. Louis F. Sherman, Sidney J. Simmonds, J. W. Stewart, Jas. B. Sumwalt, H. B. Thillman, James A. Tierney, F. S. Trainor, A. L. Tumbleson, J. L. Walz, W. J. Witherspoon, Henry G. Wolf. The graduates whose names are marked with an asterisk (*) were the recipients of the various prizes, consisting of gold medals; and Jas. A. Hardison was awarded the junior college prize of a gold medal. Prof. Wm. Simon delivered an oration.

The Cincinnati College of Pharmacy held its sixteenth commencement in the lecture hall of the College, February 16th, when twenty-one gentlemen and one lady graduated. Addresses were delivered by Hon. Amor Smith, Mayor of the

city; F. A. Kautz, President of the College, and by Professor Chas. T. P. Fennel. The recipients of the prizes, consisting of gold medals, were G. Ridenour (general average), Cora Dow (materia medica), G. L. Goeltz (pharmacy), H. L. Grimes (practical pharmacy), and C. A. Apmeyer (chemistry.) V. Muehlberg, of the junior class, received two gold medals, for general average and for proficiency in botany. Professor Fennel now holds the Chair of Pharmacy, made vacant by the resignation of Professor J. U. Lloyd.

The Louisville College of Pharmacy, at its annual meeting, elected the following officers to serve during the ensuing year: President, J. W. Fowler; Vice-Presidents, Otto E. Mueller and Oscar Dilly; Treasurer, Edward Scheffer; Recording Secretary, Fred C. Miller; Corresponding Secretary, Edward Speidel, and A. J. Schoettlin, Curator.

The Alumni Association of the same College held its annual meeting March 14th, and elected Oscar Dilly president. The other officers are Peter Schlosser and George Stauber, vice-presidents; Phil. Heuser, treasurer; E. Constantin, recording secretary, and R. J. Frick, corresponding secretary. Later in the evening the members and invited guests sat down to a banquet in the main hall of the Musical Club.

The Chicago College of Pharmacy held its twenty-fourth commencement at the Grand Opera House, March 1st, when President Buck conferred the degree of Ph.G. upon forty-six graduates. The Biroth prize, a microscope, was awarded to J. E. Grubb, and the operative pharmacy prize to W. C. Hovey. Louis Schmidt received the junior microscopical prize.

The St. Louis College of Pharmacy held its twenty-second commencement at Memorial Hall, March 14th, the graduating class numbering fifty-one. R. E. Maupin received the Alumni medal; the same gentleman and A. J. Fischer the analytical prize; L. C. A. Last, a microscope for proficiency in histological botany, and T. Wortham a copy of the National Dispensatory. Valedictory addresses were delivered on behalf of the faculty by Dr. Allegue, and on behalf of the class by A. J. Fischer.

The Alumni Association, St. Louis College of Pharmacy, held its annual meeting Feb. 21st, and after transacting the usual routine business, elected Thos. A. Buchland, president; H. Gallenkamp and B. J. Otto, vice-presidents; H. M. Whelpley, recording secretary; G. H. J. Andreas, corresponding secretary; C. Gietner, treasurer, and F. Hemm, registrar.

The California College of Pharmacy opens its sixteenth annual lecture session on Monday, April 2d, Professor Wm. M. Searby delivering the introductory lecture. Professor Grazer having resigned the chair of materia medica, the vacancy was filled by the election of Professor Searby, who formerly held the same position.

The Pharmaceutical Society of Australasia has issued its thirty-first annual report in advance of the annual meeting, held March 14th, at the College of Pharmacy, Swanston street, Melbourne. In order to provide the requisite accommodations for the increased number of students, the Minister of Lands has

promised the granting of land immediately in the rear of the present building. During the year thirty-one new members were elected, and the financial position of the Society is in a satisfactory state.

The Alumni Association, Philadelphia College of Pharmacy, during the past session, held five monthly social meetings the last one taking place January 31, at which many of the members of the class were present to listen to the lectures and discussions. The subjects of the various lectures were as follows: Some points in medical jurisprudence, by Prof. J. J. Reese; Milk, its composition and analysis, by Prof. H. Trimble; Philosophy of a common cold, by Prof. Woodbury; How we digest our food, by Dr. C. B. Lowe; Chocolate, by Dr. A. W. Miller; Slight wounds and how to treat them, by Dr. O. Horwitz; Some practical legal suggestions to the druggist, by E. L. Tustin, Esq.; and The ideal druggist, by Mrs. H. Payne Westbrook, M. D.

The museum was kept open daily from 3 to 6 o'clock P. M. as a reading room under the supervision of the secretary of the Alumni Association, and many pharmaceutical, medical and literary journals, as well as daily papers, were kept on the tables.

The annual meeting was held Friday March 16th. President Ross being absent on account of sickness, the first vice-president, Dr. C. B. Lowe, presided and read the president's address, in which among other matters it was urged that efforts be continued for the erection, at an early day, of a suitable building in front of the present college buildings, and the appointment of a committee was recommended for the purpose of making arrangements for the celebration of the twenty-fifth anniversary, next year, of the Association. The draft of a new constitution was duly considered and adopted. The membership during the past year was considerably increased, over 130 graduates joining. The treasurer reported a cash balance of \$380 on hand.

The election of officers for the ensuing year resulted in the choice of Dr. C. B. Lowe, class 1884, for president; Dr. B. Frank Scholl, class 1882, and W. Nelson Stem, class 1873, vice-presidents; Jos. W. England, class 1883, corresponding secretary; and as members of the Executive Board, D. W. Ross, class 1877; Dr. C. A. Weidemann, class 1867; G. J. Blomer, class 1887; W. L. Cliffe, class 1884; F. X. Moerk, class 1884; T. L. Buckman, class 1874; D. H. Ross, class 1878, and H. A. Newbold, class 1870. E. C. Jones, W. E. Krewson and T. S. Wiegand were re-elected treasurer, recording secretary and trustee of sinking fund, respectively, positions which they have held for a number of years. As orator for 1889 Dr. Henry Fisher, class 1877, was chosen, and Professor Emlen Painter, class 1866, as alternate.

The Alumni reception to the graduating class was held at St. George's Hall on the evening of March 16th, Dr. C. B. Lowe presiding. Josiah H. Lilly, Ph. G., class 1882, delivered the annual oration. The Alumni gold medal for best examination was taken by Wm. Crutcher; and certificates for excellence in the different branches were awarded as follows: *Materia medica*, E. J. Jacobs; *Pharmacy*, Ella Amerman; *Chemistry*, J. L. D. Morison; *Specimens*, J. E. S. Bell; *General Pharmacy*, W. C. Kalteyer; *Operative Pharmacy*, F. E. Murphy; *Analytical Chemistry*, J. W. Travis; and for the best *Herbarium*, L. L. Walton. The microscope formerly belonging to the late C. Fred. Zeller, after a competitive examination in practical microscopy, was

awarded to W. H. Clark. Herbert Ray, of Portland, Oregon, was the recipient of the junior testimonial for best scholarship.

The newly elected members of the Association received their certificates of membership, and the members of the class in microscopy, who had passed a successful examination in that branch, received a testimonial to that effect.

The class oration was delivered by W. Crutcher; the history of the class was given by Claude G. Johnson; and the future of the class was predicted by J. L. D. Morison, who also read the poem of the class poet, E. J. Jacobs, the latter being prevented from attending. The College Glee Club, under the direction of its musical director, Albert J. Lynch, contributed much to the entertainment of the evening.

The Zeta Phi Alpha Chapter of the Philadelphia College of Pharmacy held its fourth triennial banquet in the museum of the College, building on the evening of March 15th. The committee, of which Henry A. Newbold was chairman, had made very satisfactory arrangements for the occasion. A microscopic exhibition was given under the supervision of Albert P. Brown, Instructor in Microscopy; and a bountiful repast had been provided for the members, most of whom were accompanied by ladies. In the absence of President Kennedy, owing to illness, Wm. E. Krewson presided, and Dr. A. W. Miller acted as toast-master.

EDITORIAL DEPARTMENT.

Relations Between Physicians and Pharmacists.—The publication of the "Transactions of the Medical Society of the State of Pennsylvania," for 1887, affords us an opportunity of learning the official record made of the reception by the Medical Society of a Committee appointed by the Pharmaceutical Association for the purpose of presenting resolutions, soliciting the aid and co-operation of the Medical Society in promoting the prescribing by physicians of officinal medicines only, or of preparations the working formula of which is known; also for inviting the Medical Society to send delegates to the meetings of the Pharmaceutical Association. The Committee of pharmacists consisted of the Chairman, Chas. A. Heinitch, of Lancaster; Prof. J. P. Remington, of Philadelphia; John M. Cunningham, of Pottstown; Chas. T. George, of Harrisburg, and C. F. Randolph, of Altoona; and all these members were present at the meeting held at Bedford Springs, June 29th. After the credentials were read by Dr. W. B. Atkinson, the permanent Secretary, Mr. Heinitch made a brief address, which was well received, dwelling upon the intimate and important relations between the two kindred professions, and upon the mutual interest and good fellowship subsisting between the two bodies. The resolutions of the Pharmaceutical Association were read by Prof. Remington, who afterward made an earnest address on the desirability and necessity of official intercourse between the medical and pharmaceutical state societies.

On motion of Dr. Parish, of Philadelphia, the whole subject was referred to a Committee, consisting of Drs. W. G. Weaver, Wilkesbarre; H. A. Kelly

and J. W. Holland, Philadelphia. This Committee had a consultation with the pharmacists, and on the following day presented a report embodying a series of resolutions, which, after being slightly amended, were adopted as follows:

WHEREAS, The prescribing of proprietary and copyrighted medicines has become an evil, whose tendency is to create a spirit of indifference among medical practitioners to the claims of true and legitimate therapeutics; and

WHEREAS, The practice of prescribing such medicines is an unmitigated evil, and an injury to the members of the medical profession, and opposed to the code of medical ethics; therefore

Resolved, That this Society expresses its hearty approval of the resolutions presented by the Pennsylvania Pharmaceutical Association, recommending that physicians prescribe official medicines in preference to all others, and that in no event should physicians prescribe preparations the practical working formulæ of which are not clearly published or made known.

Resolved that this Society appoint a committee of three to attend the next meeting of the State Pharmaceutical Association, to represent us in that body.

The committee recommended also an amendment to the by-laws for the appointment of a standing Committee on Pharmacy, "whose duty it shall be to consider all matters pertaining to Pharmacy, and who shall be empowered to represent this Society in conference with a similar committee to be appointed by the Pennsylvania Pharmaceutical Association; they shall report annually the result of their joint labors." This amendment will be acted on by the Medical Society at its next annual meeting to be held in Philadelphia, commencing June 5th.

The committee to attend the meeting of the Pharmaceutical Association, which will be held in Titusville, commencing June 12th, consists of Drs. W. G. Weaver, Wilkes-Barre; H. A. Kelly, Philadelphia, and T. J. Young, Titusville.

The intercourse which has thus been inaugurated between the two state societies may, and we trust will, be productive of much good and of mutual profit. The frank spirit which has prompted the appointment of the first committee, the manly and courteous manner in which the committee was received, and the prompt and approving action by the Medical Society augur well for the future intercourse between the two societies; and we have no doubt of favorable and mutually satisfactory results, if questions bearing on the relations between the two professions should come up before committees like the one contemplated by the above amendment, or subsequently before the societies after the frank and full exchange of individual views of the members of such committees. There is no reason whatever why similar relations could not be cultivated between the two national societies, or in fact between local representative societies of the two professions; the desirability and practicability of such, as far as the national societies are concerned, have been pointed out by Dr. E. Cutter and Prof. Remington (see February number, page 65); the good influence of such a course in combating acknowledged evils would soon be felt.

PROCEEDINGS OF STATE PHARMACEUTICAL ASSOCIATIONS.

Connecticut.—The twelfth annual meeting was held at Willimantic, February 7th and 8th, President Whittlesey in the chair. There are 255 names on the roll of members, and a cash balance of \$1265 was in the treasury, of which sum \$1000 were ordered to be permanently invested. Reports of the officers and of the various committees were read and disposed of; several papers were read, visits to some industrial establishments were made, and the usual routine business was transacted. Mr. H. H. Daboll, New London, was elected president, and D. G. Stoughton and L. E. Southworth vice-presidents. Messrs. F. Wilcox, Waterbury, and L. H. Goodwin, Hartford, were re-elected, the former secretary, and the latter treasurer. The next meeting will be held at Hartford, on Tuesday, February 5, 1889.

Illinois. Pp. 160.—The minutes of the eighth annual meeting held at Decatur, August 23-25, 1887, with the reports and papers read etc. Henry Smith, of Decatur, is president; W. P. Boyd, J. E. Espey and C. F. Prickett, vice-presidents; L. C. Hogan, Englewood, secretary, and C. A. Strathman, El Paso, treasurer. Next meeting at Peoria, on the third Tuesday (21st) of August next; W. M. Benton, local secretary.

Texas. Pp. 57.—See July number 1887, p. 376. The ninth annual meeting takes place at Austin, May 8th.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Collection des anciens Alchimistes Grecs, publiée sous les auspices du Ministère de l'Instruction publique, par M. Berthelot, sénateur, etc., Avec la collaboration de M. Ch. Em. Ruelle, bibliothécaire à la bibliothèque Sainte-Geneviève. Première livraison. Paris: Georges Steinheil, éditeur, 1887. 4to. pp. 268, 106 and 115.

Collections of ancient Greek Alchymists, published under the auspices of the Minister of Public Instruction, by Mr. Berthelot, senator, etc., with the assistance of Mr. C. E. Ruelle, librarian, etc.

A very interesting historical publication, divided into three differently paged parts, of which the second contains the Greek text of manuscripts by Democritus, and the third the French translation of the same, while the first part is introductory to the whole work, of which the volume before us is only the first instalment. We find here a brief general account of the ancient manuscripts preserved in the museum of Leyden, and which were published in 1885, by its director C. Leemans. In a general way the relations between the metals and planets are explained; the sphere of Democritus and its use by the astrologer-physicians; alchymistic signs, notations, receipts, apparatus and utensils. Then follow accounts of a number of alchymistic manuscripts, preserved in different places, and a list alphabetically arranged, of minerals, metals, salts, processes, etc., which are mentioned in the writings of alchymists.

From this brief outline it will be seen that the publication is of lasting value to the student of the history of chemistry. The typographical arrangement and appearance are very attractive, and the quaint illustrations, faithfully representing various alchymistic utensils and devices, are in keeping with the character of the work.

An account of the Institution and Progress of the College of Physicians of Philadelphia during a hundred years, from January, 1787. By W. L. W. Ruschenberger, M. D. Philadelphia, 1887, 8vo., pp. 308.

In his usual clear and systematic manner the author presents in this volume a history of one of the oldest medical associations in North America. It appears from the preface that the minutes are still intact, but since other papers, like reports, essays, etc., have not been carefully preserved or arranged, the task of collecting the material must certainly have been a very laborious one. But now that the work has been accomplished, it will remain as one of the convenient and reliable sources of reference relating to medicine in our country. To pharmacists it is of particular interest that in 1788 a committee was appointed to form a pharmacopœia for the use of the College. Such a work does not appear to have been elaborated; but early in 1789 the College issued a circular with the view of inducing suitably qualified persons throughout the country to co-operate in the formation of a Pharmacopœia of the United States, an object which in a measure was accomplished only thirty years afterwards, though the Pharmacopœia of the Massachusetts Medical Society published in 1808 was commended for its accuracy. Further information is furnished by the book concerning the unabated interest shown by the College in the various revisions of the national pharmacopœia, and also of the manner in which pharmacists became connected with the pharmacopœia, which began with the committee of the College, in 1839, securing the assistance of Messrs. Wm. Hodgson and Wm. Procter for the preliminary revision, the result being laid before the Pharmacopœial Convention of 1840.

The Prescription, therapeutically, pharmaceutically and grammatically considered. By Otto A. Wall, M. D., Ph. G., Professor of Materia Medica and Botany in the St. Louis College of Pharmacy, etc. St. Louis, Mo., 1888. Published by the Aug. Gast Bank Note and Lithograph Co. 8vo., pp. 184.

This work differs in several respects from other works on prescription writing, which usually confine themselves to the construction of prescriptions, the calculation of doses, the grammar, weights and measures. Such works are rarely of interest to others than the young physician. The work before us takes a wider range, and deserves to be read and consulted by both physicians and pharmacists, as the facts stated by the author, are expressed with clearness and accuracy, and the scope is far more comprehensive. We are pleased to note the fact that in most of the views expressed by the author we can and do heartily agree, though from others we must dissent. This is not the place to enter into elaborate arguments, but we may briefly state that the most essential point wherein our views diverge from those of the author, are in regard to "specifying" in prescriptions (page 30.) If a preparation—whether chemical or galenical—agrees with the requirements of the pharmacopœia, it is a legitimate one for dispensing under the pharmacopœial title; but if a physician prescribes such a preparation, attaching thereto a manufacturer's name, he steps beyond the pharmacopœia and orders an extra-pharmacopœial article. We do not question the right of the physician to order for his patients what he considers best to relieve their sufferings, whether the article be a vulgar nostrum, a proprietary or elegant special, or of pharmacopœial origin; but we deplore the supposed necessity for stepping outside the pharmacopœia without cogent reasons. We are well aware that such a course has been apparently justified by the recent introduction of numerous synthetically prepared reme-

dies, the process for the manufacture of which is protected by patents; but we submit that the case is entirely different, since these do not pretend to be pharmacopœial preparations.

Prof. Wall's work commences with general considerations about prescriptions and pharmacopœial (called *official*) and non-pharmacopœial (called *officialinal*) preparations; then follows a chapter on weights and measures, speaking a good word for decimal numeration and systems. The third chapter, on language, treats in a very clear way of the grammatical construction of prescriptions, and of the various terms and abbreviations employed including words and phrases which may be considered obsolete in the United States. The concluding chapter on extemporaneous prescriptions is replete with sound advice and practical suggestions, and a good index aids in consulting the work which we heartily recommend to both physicians and pharmacists.

Flora Peoriana. The vegetation in the climate of Middle Illinois. By Frederick Brendel. Peoria, Ill.: J. W. Franks & Sons, 1887. 8vo. pp. 89.

This excellent monograph on the flora of a small portion of Illinois is the result of 35 years of observation, and constitutes a very valuable contribution to phyto-geography. We have noticed the same work in this Journal, 1883, p. 57, when five years ago, it appeared as a reprint from the transactions of the Hungarian Museum at Budapest. Close and careful observation, protracted study and critical deductions are *evident throughout* the entire work.

Report on the Flora of Western and Southern Texas. By Dr. V. Havard, U. S. A.

This reprint from the Proceedings of the U. S. National Museum, vol. viii., is a valuable contribution towards our knowledge of the distribution of plants in a portion of Texas. It takes into consideration the typographical, climatic and other conditions favoring the homes of plants or interfering with their vigorous development, and under "Economic Notes" gives very valuable information, of the uses to which many plants are put, or of their deleterious influence upon man or various animals.

OBITUARY.

Joseph Zentmayer, the well-known optician, died in this city March 29th, after a lingering illness, at the age of 62 years. He was born in Mannheim, Germany, March 27th, 1826, where he also learned his trade as a maker of mathematical and astronomical instruments. He came to this country in 1848, and five years later established himself in Philadelphia as a manufacturer of instruments of precision. In 1855 he made his first microscopes for the Academy of Natural Sciences and for Dr. Paul B. Goddard and others of its members, and henceforth he devoted his time and energy towards the perfection of this instrument with such success, that the Zentmayer microscopes soon enjoyed a world-wide reputation. These instruments have made his name familiar to the pharmacists, and to photographers it became known through the Zentmayer objective, a novel combination of lenses, particularly useful for very high objects. The deceased was a member of the American Philosophical Society, the Academy of Natural Sciences, etc., and an honorary member of the American Association for the Advancement of Science.

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Meetings of State Pharmaceutical Associations.

STATE.	TIME.	PLACE.	LOCAL SECRETARY.
Alabama.....	May 8th.....	Selma.....	G. A. Cunningham.
Delaware.....	May 2d.....	Wilmington.....	J. M. Harvey.
Florida.....	May 8th.....	Tallahassee.....	J. A. Conover, Jacksonville.
Indiana.....	June 6th.....	Fort Wayne.....	J. R. Perry, Indianapolis.
Iowa.....	May 2d.....	Des Moines.....	Norman Lichty.
Kansas.....	May 17th.....	Ableene.....	E. F. Lewis.
Kentucky.....	May 8th.....	Henderson.....	R. Y. Johnson, Louisville.
Louisiana.....	April 11th.....	New Orleans.....	Mrs. E. Rudolf.
Massachusetts.....	June 6th.....	Boston.....	J. C. Hearing.
Minnesota.....	June 12th.....	Stillwater.....	J. C. West, Fayette.
Mississippi.....	May 15th.....	Meridian.....	H. D. Eads, Warrensburgh.
Missouri.....	June 19th.....	Sweet Springs.....	W. C. Lane.
Nebraska.....	May 8th.....	Lincoln.....	H. M. Smith.
New Jersey.....	May 16th.....	Morristown.....	G. A. Dykeman.
New York.....	June 18th.....	Catakill.....	H. C. Cook.
Ohio.....	June 12th.....	Columbus.....	D. Lippincott.
Pennsylvania.....	June 12th.....	Titusville.....	E. D. Oesch, Fort Worth.
Tennessee.....	May 8th.....	Chattanooga.....	F. Clark.
Texas.....	June 12th.....	Austin.....	C. Meakemeller, Wheeling.
Virginia.....	May 8th.....	Danville.....	
West Virginia.....	June 19th.....	Clarksburg.....	

The Eighth Pharmaceutical Meeting of the series will be held in the Museum of the College of Pharmacy, Tuesday, May 15th, at 3 30 P. M. All interested in pharmacy and allied sciences are invited to attend and bring forward any matters of interest to the profession.

T. S. WIEGAND, Registrar.

NOTICE TO PENNSYLVANIA PHARMACISTS.

All Pennsylvania Pharmacists entitled to Certificates of Registration have now received them, and they are hereby notified that to constitute "good and sufficient evidence of registration" said certificate must be kept conspicuously displayed in the place of business of the person registered.

The display of the Certificate being the only visible evidence to the public of proper registration, any person failing to comply with this provision will become liable to prosecution for carrying on the business without a Certificate.

The next examination will be held in July in the northern or western part of the State.

Applicants for examination should apply to the Secretary of the Board late in June for the exact date and place of the meeting.

By order of the State Pharmaceutical Examining Board,

H. B. COCHRAN, SECRETARY.

LANCASTER, PA., April 13th, 1888.

Pennsylvania Pharmaceutical Association.

The Eleventh Annual Meeting will be held in Titusville, TUESDAY, JUNE 12th 1888. The first session will begin at 7 P. M. The remaining sessions will occupy the two following days. Good hotel accommodations have been secured at reduced rates. Rail-road fare at excursion rates are also expected.

Both the place of meeting and the Exhibition Room will be in the new Armory Building, the latter occupying the first floor. Articles intended for the Exhibition should be sent to the Local Secretary, C. D. Lippincott, Titusville. Arrangements are in progress for making this occasion a very pleasant one to all who will attend the meeting.

J. A. MILLER, Secretary.

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THE AMERICAN JOURNAL OF PHARMACY.

MAY, 1888.

PHOTOXYLIN.

By GEO. M. BERINGER, Ph. G.

Read at the Pharmaceutical Meeting, April 17th.

Under the name of Photoxylin, the Russian photographers use a pyroxylin made by nitrating wood pulp. Prof. Wahl, of St. Petersburg, recommends a five per cent. solution of this pyroxylin in equal parts of ether and alcohol as a substitute for collodion in surgical operations. He states that when applied to the skin it forms an impervious dressing that adheres firmly and is not easily rubbed off in washing. In small operations he has found it possible to dispense entirely with more bulky antiseptic dressings (see *Pharm. Journal and Trans.*, June, 1887, page 1051.)

The name "Photoxylin" has likewise been applied to this solution.

There being some demand for this dressing created by the publication of the statement of Dr. Wahl in the various medical and pharmaceutical journals, the writer was induced to try some experiments on the manufacture of the same.

The wood pulp desired was kindly furnished by a manufacturer both in the loose fibrous form and in the shape of sheets rolled under reduced pressure so as to leave the resulting sheets thick and porous. These samples of wood pulp were carefully dried.

Several processes of nitrating were tried with mixtures of nitric and sulphuric acids, and also with potassium nitrate and sulphuric acid. The following process, a modification of a formula used for collodion cotton, gave good results and was adopted:

Nitrous acid, 43° Baumé.....	3½ lb. av.
Sulphuric acid.....	4½ lb. av.
Potassium nitrate, granular.....	8 oz. av.
Wood pulp.....	4 oz. av.

The nitrous and sulphuric acids are mixed in an earthenware crock and allowed to stand until the temperature has fallen to 90° F., when the potassium nitrate is added and thoroughly incorporated with the acid mixture; the wood pulp is then immediately immersed in the mixture and allowed to remain for 12 hours. It is then removed from the acid and thoroughly washed. A few drops of ammonia water added to the wash water greatly facilitates the thorough washing and removal of the acid.

The nitro-cellulose thus prepared leaves little or no residue on burning and is entirely soluble in a mixture of 50 per cent. concentrated ether and 50 per cent. alcohol. Although Prof. Wahl recommends 5 per cent., I find that 3 per cent. of this pyroxylin is sufficient to make a very thick fluid, which on application leaves a very tough film. The addition of 5 drops of castor oil to the fluidounce is sufficient to render it flexible. The advantage which photoxylin possesses over collodion is the additional strength of the film.

MODIFICATION OF THE FORMULA FOR TINCTURE OF IPECAC AND OPIUM, U. S. P.

BY WM. H. CLARK, PH.G.

Some trouble having been experienced with tincture of ipecac and opium, U. S. P., from its tendency to ferment, a suggestion as to a formula that will produce a stable preparation may be found acceptable.

A sample of tincture of ipecac and opium was made strictly in accordance with the instruction of the U. S. Pharmacopœia, from material also prepared personally according to the same authority. The amount of alcohol in the finished tincture was determined, and found to be 17.75 per cent. of absolute alcohol, by weight, showing it to be weaker in alcoholic strength than both its constituent preparations. If, however, the U. S. P. formula be amended so as to use strong instead of diluted alcohol to make 100 parts of finished product, the tincture will contain over 20 per cent. of absolute alcohol by weight, and experience with large quantities, made by this method, has shown the preparation to be permanent, and satisfactory in every respect.

MADRID, N. Y., April 18, 1888.

EXTRACTUM RUBI FLUIDUM.

BY CHARLES BORN EVANS, PH.G.

From an Inaugural Essay.

Fluid extract of blackberry, as made by the formula authorized by the Pharmacopœia, is a preparation which decomposes quite rapidly, and upon standing for a short time becomes very unsightly. I have been experimenting for some time in order to ascertain, whether a menstruum could not be found that would prevent this decomposition, and yet extract the medicinal properties of the drug, and have succeeded in making some preparations which have stood very well for a month or two.

It was found impossible to prevent a slight precipitation when the reserve portion and the evaporated soft extract were brought together, but in some cases this residue was quite inert.

Six different preparations were made, using the bark in all cases in No. 60 powder.

For No. 1 the menstruum was alcohol 9 parts, water 7 parts, with 20 per cent. of glycerin. The drug was moistened, packed and macerated according to the rule specified for the making of fluid extracts. After the portion to be reserved was obtained, the drug was exhausted with a mixture of alcohol and water, in the proportion of 9 parts of alcohol to 7 parts of water.

Different menstrea were used in the other preparations, but the pharmacopœial rule of manipulation was followed for all, and in each case the menstruum remained unchanged, except that the glycerin was omitted for the percolation of the last portions of tincture. The menstruum consisted for No. 2, of alcohol 2 parts, water 1 part, and 20 per cent. of glycerin; for No. 3, alcohol 3 parts, water 1 part, with 20 per cent. of glycerin; for No. 4, alcohol 4 parts, water 1 part, with 20 per cent. of glycerin; for No. 5, alcohol 3 parts, water 1 part, glycerin, 30 per cent., and for No. 6, alcohol 4 parts, water 1 part, with 30 per cent. of glycerin.

Shortly after the liquid commenced to drop from Nos. 1 and 2, there was a slight sediment deposited upon the bottom of the bottle; and as the liquid rose in the bottle there was more or less of a deposit upon the sides, the deposit being larger in No. 1 than in No. 2. By the time the drug was exhausted, the bottles which received the weak percolates were entirely coated with a grayish deposit, while there was

a thick sediment upon the bottom. After recovering the alcohol from these weak percolates, the residue left in the still was quite large and of a mottled brown color. This improved as the liquid was evaporated upon a water-bath, and by the time it was in the condition of a soft extract, the color was almost pure black, as it should be. As soon as the reserve portion was added to the evaporated extract, the liquid assumed a brown color, and after standing 24 hours, the brown portion sank to the bottom, while the remainder of the liquid regained its original black color.

All the preparations behaved in the same manner, but in the more strongly alcoholic liquids the original color was regained more rapidly and the deposit was slight, while in Nos. 1 and 2 it occupied fully one-third of the bottle.

Nos. 3 and 4 were very much alike in their behavior. The reserve portions of both stood for several days without any deposit forming upon the sides or bottom of the bottles. There was, however, a slight deposit in the bottle which received the weak percolate from No. 3. In the case of No. 4, the weak percolate was as clear when the drug was exhausted as when the operation commenced. The residue left in the still after recovering the alcohol from Nos. 3 and 4, was quite small compared with that of Nos. 1 and 2, and was of a clear black color. As mentioned before, when the reserve portion was added to the evaporated portion, there was a precipitation, but quite small in both preparations.

The fluid extracts in Nos. 3 and 4 were allowed to stand for some time, and then filtered. The residue collected upon the filter in either case was very small. Washing it with boiling water had very little effect, except to take out the coloring matter in part. What remained was of a white waxy appearance, and soluble in strong alcohol. It was immediately precipitated from its alcoholic solution by pouring it into water. When the water was evaporated and the residue dried it was of a greenish color and entirely tasteless.

Both preparations have been standing for over a month since they were filtered, and as yet show no signs of decomposition, and by their taste one is assured that they have lost little, if any, of their astringency on account of the precipitation which took place when they were first made.

No. 5 and 6 were made of the same alcoholic strength as 3 and 4, but contained 10 per cent. more of glycerin. As far as can be seen

they are in no way different from 3 and 4. Their behavior throughout during the process of preparation was the same as that of 3 and 4, and the finished products are apparently the same, and just as likely to remain perfectly clear upon standing.

In all the preparations the menstruum used entirely exhausted the drug. In No. 1, all the coloring matter was removed; in No. 2, nearly all, while in 3, 4, 5 and 6 the liquid continued to drop colored after the drug was entirely tasteless. But the coloring matter is of little moment since astringency is what is required in this preparation.

ASPIDIUM MARGINALE, WILLDENOW.

By CHARLES DEWALT KEEFER, Ph.G.

From an Inaugural Essay.

The drug was collected in September along a hillside, facing northward, of South Mountain, Franklin County, Pa., and on being dried by artificial heat at a temperature of about 31° C., lost 64.824 per cent. Two years ago 185 rhizomes were collected and dried, the loss being 60.454 per cent.

For analysis 50 gm. of the drug reduced to No. 60 powder were used. It was exhausted with petroleum spirit, and the liquid distilled, evaporated and kept at 100° C., when the oily residue weighed 4.40 per cent. This, on exposure to 110° C., lost 0.40 volatile oil, and by treatment with hot absolute alcohol was separated into 1.0 wax and 3.0 fat, the latter dissolving in the hot alcohol, melting at 40° C., and saponifying with soda solution.

The ethereal extract consisted of 0.61 per cent. of resin and chlorophyll, was free from tannin and sugar, and like the petroleum extract, had an offensive odor and nauseous bitter taste.

The alcohol extract weighed 3 per cent., was yellowish-brown, sweetish and astringent, and was partly soluble in water. From the aqueous solution 0.60 filitanin was precipitated by lead acetate (0.54 by copper acetate), and the filtrate contained 0.2848 cane sugar, which, after boiling with hydrochloric acid, was estimated with Fehling's solution. The portion insoluble in water contained phlobaphene and a bitter principle.

Treatment with distilled water yielded a liquid from which, with

three volumes of wood alcohol, 0.24 per cent. mucilage was precipitated. The filtrate contained 2.40 dextrin, glucose and other carbohydrates.

The liquid obtained from the partly exhausted drug by treatment with 0.20 per cent. solution of caustic soda, yielded with acetic acid and wood alcohol a precipitate of 7.50 per cent. of pectin and albuminoids (ash deducted), while the filtrate still retained 6.82 per cent. organic substances dissolved from the drug.

Diluted hydrochloric acid now dissolved from the drug 0.84 per cent. calcium oxalate, 0.71 parabin and 0.80 albuminoids; and by further treatment with chlorine water, and with nitric acid with the addition of potassium chlorate, the lignin and hydrocellulose were separated, leaving 50 per cent. of the original weight of the drug, representing resistant carbohydrates including cellulose. The starch, 7.186 per cent., was determined separately from a fresh portion of the powder.

Not having separated any filicic acid in the foregoing experiments, one pound of the powdered drug was exhausted with ether, and the resulting oleoresin was exposed to cold, but the acid did not crystallize out.¹ On treating a portion of the oleoresin repeatedly with warm alcohol, a few yellowish crystals formed which, however, appeared to be prone to oxidation, and could not be retained. Attempts to separate the acid with lead acetate, ammonia, fixed alkalies or lime water, were unsuccessful. With the last named agent a filtrate was obtained which with very dilute sulphuric acid produced a pinkish precipitate, insoluble in petroleum spirit, but dissolving in ether. This solution had an acid reaction, and on evaporation left an amorphous residue, giving no reaction with ferric chloride; its solution in alcohol, on being allowed to evaporate spontaneously, developed an ethereal odor.

Oleoresin of aspidium.—Two commercial samples were obtained, one of which had an odor of acetic ether, was of a dark color and of a pilular consistency, and was found to be soluble in that menstruum, and only partly soluble in ether, petroleum spirit, alcohol and absolute alcohol. The other sample was liquid, of a greenish color, had the odor of ether, and was more freely soluble in the liquids named above.

¹Crystals having the behavior of Luck's filicic acid were obtained by Mr. Jas. L. Patterson (See *AMERICAN JOURNAL OF PHARMACY*, 1875, p. 293) from the oleoresin of *Aspidium marginale* by setting it aside for several weeks.—
EDITOR.

CASSIA MARILANDICA, LINNÉ.

BY HERMANN J. M. SCHROETER, PH.G.

Abstract from an Inaugural Essay.

General characters.—American senna, as seen in commerce, consists of leaflets varying in length from one to two inches, and in breadth from one-quarter to one-half inch. In shape they are oval-oblong or oblong-lanceolate, entire or broken; of a pale green color, a feeble odor, and a bitterish sweet, nauseous taste, resembling that of Alexandria or East India senna somewhat. It is commonly found in the shops in the form of oblong or square cakes, which usually consist of leaflets, petioles and flowers compressed together in a compact form.

The investigation of this drug was conducted in the chemical laboratory of the Philadelphia College of Pharmacy, for the purpose of comparing its composition with that of *Cassia nictitans*, similarly examined by Mr. C. S. Gallaher. The leaves investigated were collected in this vicinity during the past month of August, and upon being air-dried, were subjected to the following analysis:

Proximate chemical analysis.—The scheme recommended by Dragendorff was used as a basis for the analysis of the drug. The drug was reduced to a number eighty powder. The moisture present was determined to be 8.90 per cent., and the inorganic constituents 6.80 per cent. The ash contained carbonic, phosphoric, hydrochloric and sulphuric acids. It yielded to water 1.4 potassium and sodium salts, and to hydrochloric acid 4.8 salts of calcium, magnesium and iron, the undissolved, 0.6, being silica.

The extract obtained with petroleum spirit (boiling point 45° C.) lost on heating to 110° C., 0.04 per cent. of volatile oil; the residue left, 3.60 per cent., was soft, fatty, dark-green in color, due to traces of chlorophyll, and fused at 59° C. Boiling absolute alcohol dissolved all but 0.1 per cent., which was regarded as caoutchouc. On cooling this solution separated out 0.30 per cent. of wax, which was white and soluble in chloroform. The fixed oil was also soluble in stronger ether and chloroform. On treatment with concentrated potash and soda solutions and heating, it would not saponify, but on dilution with water, it rapidly mixed with same. The soap obtained on the addition of sodium chloride to this mixture, was of a greenish-brown color; the mother-liquor having a reddish color.

The ether extract of 2.87 per cent. was less soft than that obtained

with petroleum ; of a dark green color, resinous and possessing the odor of the drug. Almost all of the chlorophyll was in this extract. It was soluble in chlorform and benzol, and partly so in absolute alcohol ; the melting point was 63° C. Water dissolved but 0.03 per cent., including a trace of tannin. To this aqueous solution, alkaloidal tests were applied to both alkaline and acid solutions, but with no results. Absolute alcohol dissolved 1.98 per cent., leaving a residue of 0.86 per cent.

The extract with absolute alcohol, representing 7.40 per cent., was mostly soluble in water ; the portion insoluble was weighed as phlobaphene. This aqueous solution was found to contain 0.625 per cent. of tannin, and 0.558 per cent. of glucose. The tannin was estimated by precipitation with acetate of lead, and also with acetate of copper ; both results varied only slightly, showing the presence of tannic acid alone. The solution after precipitation with lead acetate, and decomposing the excess of lead with H_2S gas, was treated with Fehling's solution, and the amount of glucose determined gravimetrically. The aqueous solution was also tested for alkaloids by agitating successively with petroleum spirit, benzol and chloroform, both in alkaline and acid solutions, but with negative results in all experiments.

The water extract, after deducting the ash (3.60 per cent.), amounted to 20.24 per cent., was of dark-brown color, and had the odor of burnt sugar. The mucilage was precipitated with two volumes of absolute alcohol, and by further concentration and precipitation with four volumes of absolute alcohol, dextrin, etc., was separated and estimated. The mucilage obtained was not all redissolved in water, showing the presence of some albumen in this extract, which was also estimated. The filtrate from the mucilage and dextrin after evaporation of the alcohol was precipitated with acetate of lead ; the precipitate, after weighing, igniting and deducting the inorganic substances, was calculated as total organic acids and allied substances. From another portion of this filtrate was estimated quantitatively the glucose from the cuprous oxide obtained in an alkaline copper solution by igniting it and multiplying by 0.45. Another portion of the filtrate was boiled with dilute hydrochloric acid, and then treated with Fehling's solution ; from the total amount of saccharoses thus estimated, that of the glucose previously found was deducted, leaving the amount of cane sugar present.

The powder was further treated in succession with caustic soda (0.2 per cent.) for determining albuminoids and extractive ; with hydro-

chloric acid (1 per cent.) for determining pararabin, etc.; with chlorine water for determining lignin; and with nitric acid and potassium chlorate for determining hydrocellulose. The remaining residue was weighed as cellulose after deduction of the ash.

The starch was estimated quantitatively from five grams of a fresh portion of the powdered drug. This was mixed with a 4 per cent. solution of caustic potash in alcohol, and heated to boiling for one day, using an upright condenser. After filtering and washing, the residue was exhausted with water to remove mucilage, etc. The remaining residue was then boiled with dilute HCl to convert the starch into glucose, which was then calculated from the cuprous oxide formed in an alkaline solution of copper; upon ignition and multiplying by 0.408, the amount of starch was obtained.

The results of the proximate chemical analysis are tabulated as follows :

Soluble in <i>petroleum spirit</i> :		
Fixed oil.....	3.200	
Volatile oil.....	.040	
Wax, soluble in chloroform .....	.300	
Insoluble residue—caoutchouc .....	.100	
		3.640
Soluble in <i>stronger ether</i> :		
Extractive soluble in H ₂ O—trace of tannin.....	.030	
Extractive soluble in alcohol (chlorophyll).....	1.980	
Insol. residue (decomposed chlorophyll) .....	.860	
		2.870
Soluble in <i>absolute alcohol</i> :		
Tannin .....	.625	
Glucose .....	.558	
Other extractive and coloring matter, soluble in H ₂ O	4.867	
Phlobaphenes, soluble in NH ₄ OH	1.350	
		7.400
Soluble in <i>distilled water</i> :		
Mucilage	7.740	
Dextrin and allied carbohydrates.....	2.760	
Albumin .....	.240	
Glucose	5.230	
Saccharose	3.245	
Organic acids and allied substances.....	.200	
Undetermined—active principle, coloring matter, etc. ....	.825	
		20.240
Soluble in <i>caustic soda solution</i> : (0.2 per cent).		
Albuminoids	3.200	
Extractive, not ppt. by acetic acid and alcohol.....	5.180	
		8.380
Soluble in <i>dilute hydrochloric acid</i> (1 per cent.) :		
Pararabin .....	.960	
Starch.....	5.270	
Oxalate of calcium.....	.140	
Albuminoids and extractive matter	2.350	
		8.720

Lignin	1.820	1.820
Hydrocelluloses, etc	2.760	2.760
Cellulose	23.270	23.270
Moisture	8.900	8.900
Ash	6.800	6.800
Loss	5.200	5.200
	100.000	100.000

Other experiments.—50 grams of the powdered drug were distilled with milk of lime, the distillate tested for volatile alkaloids, but with negative results. Similarly another 50 grams were distilled with a 1 per cent. solution of sulphuric acid, but no results were obtained.

Yellow coloring matter.—A yellow coloring matter, obtained in an orange-yellow mass, was found to be present in the drug, soluble in ether and chloroform, but sparingly soluble in alcohol. It was obtained by concentrating a decoction from the powdered drug, precipitating the mucilage, etc., by alcohol, and further concentrating to a syrupy liquid, which was then agitated with several portions of ether. The ether extractions, upon evaporation, left a yellow oil, which, by treatment with cold alcohol, yielded an orange-yellow mass. In *Alexandria senna*, this yellow coloring matter is supposed to be chrysophanic acid; so probably in *American senna*, it is identical with same, or some similar body.

Active principle.—A complex body was found to be present in this drug, responding to cathartic acid, both in properties and its action. It was obtained by the following process: 250 grams of the powdered drug were digested with water at a moderate temperature, the decoction obtained concentrated to a syrup, and the mucilage, etc., precipitated with alcohol. The solution being again concentrated, and several volumes of absolute alcohol added, the crude cathartates were obtained. The albumen was precipitated from this by dissolving in water and adding a few drops of HCl. The precipitate obtained, on addition of more HCl, was treated with hot 60 per cent. alcohol. From this solution the purified cathartic acid was obtained by precipitation with ether. The active principle so obtained is insoluble in water, absolute alcohol, chloroform, and ether, soluble in warm diluted alcohol, is of a brownish-black color, amorphous, soluble in alkalies with dark-brown color, and reprecipitated by acids. Tannin, antimonial salts, yellow and red prussiates, have no effect upon it. Color tests, with strong acids, were following: With H_2SO_4 , green brown: H_2SO_4 and $\text{K}_2\text{Cr}_2\text{O}_7$, greenish black; with HNO_3 and HCl, no change.

Physiological action.—The medicinal properties of the drug were experimented with fully. The ethereal and alcoholic extracts were taken internally, representing in each case up to 20 gm. of the drug; the latter produced some griping effects, but neither, cathartic results. An aqueous infusion produced cathartic effects, but in half times larger dose than the officinal senna. The active principle obtained from the drug was also taken, producing decided cathartic effects.

In conclusion, the writer would state as his belief, that American senna does contain an active principle, which responds to the cathartic acid of Alexandria senna in all respects, existing in the former drug only in smaller quantity.

GLEANINGS IN MATERIA MEDICA.

BY THE EDITOR.

Scopolia japonica.—Martin stated in 1878 that Japanese belladonna root contains solanine, but does not yield atropine. In 1880 Langgaard announced the presence of two alkaloids resembling atropine in physiological action, and which were designated as scopoleine and rotoine. Eykman, in 1883, regarded scopoleine as probably identical with one of the alkaloids of the atropine group, and isolated the glucoside scopolin and its derivative scopoletin. E. Schmidt and H. Henschke have recently examined the alkaloids (*Archiv d. Phar.*, March, 1888, p. 185–202) which were with difficulty separated by fractional precipitation with gold chloride into atropine, hyoscyamine and hyoscyne, the mother liquor containing tropine; choline was likewise isolated from the extract. The three mydriatic alkaloids are present in the commercial root in very variable proportion, and in some of the samples hyoscyne was wanting. Commercial scopoleine was ascertained to consist of the same alkaloids varying in proportion and not entirely soluble in ether.

Henschke (*Archiv*, 1888, p. 203–211) has also isolated the fluorescent compound scopoletin which is soluble in alcohol, ether, chloroform, acetic acid and in boiling water. The aqueous and alcoholic solutions show a quinine-blue fluorescence, changing to bright blue-green on the addition of alkalis. Scopoletin melts at 199°C. and is identical with the chrysotropic acid of Kunz. The aqueous solutions of both compounds are colored black-green by strong nitric acid; by gold chloride

cobalt-blue, followed by reduction; by ferric chloride green, gradually forming a dingy-green precipitate; by potassium permanganate dark-green with blue fluorescence, changing on the further addition of a little sulphuric acid to indigo-blue. These compounds have a composition very similar to that of methyl-æsculetin; but the latter prepared from æsculetin melts at 184° and is not colored green by ferric chloride. Henschke did not succeed in obtaining from the extract a notable quantity of scopolin; but by boiling the extract with acid the yield of scopoletin was increased to 0.156 per cent.

Commercial rotoine (*Archiv*, 1888, p. 211–214) was ascertained by Henschke to be not Langgaard's alkaloid, but simply the soda soap of the fat contained in the Japanese scopolia root.

Scopolia Harnackiana.—The cultivated root, collected in May, contains an alkaloid which according to Ernst Schmidt (*Archiv*, 1888, p. 215) is identical with hyoscyamine; a fluorescent compound, possibly scopoletin, was likewise present. Atropine and hyoscyne could not be isolated from the gold double salt.

Asarum europæum, *Linné*.—The volatile oil has been examined by A. S. F. Petersen. It contains a terpene $C_{10}H_{16}$ boiling between 162° and 165° C., and in its properties agreeing with the pinene of Wallach. The principal constituent is an oil, boiling between 247° and 250° , having the empirical formula $C_{11}H_{14}O_2$ and being identical with the methyl-ether of eugenol, which has hitherto not been observed in plants, but has been repeatedly prepared synthetically; by oxidation with potassium permanganate it yields dimethyl-protocatechuic acid, and, on treatment with hydriodic acid, methyl-iodide is produced. Near 300° a green or blue oil is obtained; the green fractions contain a considerable quantity of the stearopten asaron (boiling point 296°), the presence of which materially interferes with the investigation of the higher boiling portion.

In the volatile oil of *Asarum canadense* Petersen found the same terpene, and the oil boiling between 245° and 250° , which is probably identical with the asarin of Power; a blue oil with a high boiling-point is likewise present, and compound ethers particularly of acetic acid, which are absent from the European oil. The American oil does not contain asaron.—*Archiv d. Phar.*, Feb., 1888, p. 89–123.

Composition of Mastich.—Prof. E. Reichardt reports (*Archiv d. Phar.* 1888, p. 154–163) the results of investigations undertaken by Klemm with recently obtained clear and with old dusty mastich. The specific

gravity of the former was 1.068, and of the latter 1.072. Benzol dissolved from old mastich 66 per cent., and from the recent article 90 per cent.; the elementary analyses of these portions render it likely that they consist mainly of $C_{10}H_{16}O$ mixed with $C_{10}H_{16}O_2$ in variable proportions, depending upon age and exposure. The portion, insoluble in benzol contains less carbon, and as obtained from recent mastich, agrees with the formula $C_{10}H_{15}O_3$, and that from old mastich, with $C_{10}H_{15}O_4$. On dry distillation old mastich only yielded a distillate of a very slight acid reaction; the tar commenced to boil at 75° , and yielded a colorless fraction, boiling at 108° , a yellow portion boiling at 220° , and a dark green oil, boiling at 350° . All contained oxygen and possessed an odor recalling that of thyme, lavender or rosemary.

Lupinus albus, Lin.—Campani and Grimaldi isolated from the seeds *vanillin*, and proved its identity by the crystalline form and by its chemical properties.—Chem. Repert. 1888, p. 76.

Anagyris foetida, Lin.—The seeds yielded to Nicola Reale, with ether, a fixed oil, resin, resinous anagryric acid, and a lemon-yellow substance, probably a glucoside. Alcohol extracted yellow coloring matter, glucose, sugar and an alkaloid, anagryrine, $C_{11}H_{24}NO_8$, which is amorphous, deliquescent and bitter.—Chem. Repert., 1888, p. 77.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the AMERICAN JOURNAL OF PHARMACY.

MIXED STROPHANTHUS SEEDS AND THEIR INSECT. Mr. Catillon recently told the *Société de Thérap.*; (*Prog. Méd.*, March 31, 1888), that a package of seeds received by him from the Niger contained several varieties, and that these were usually sold together under the name of *S. hispidus*. The mixed seeds contained $7\frac{1}{2}$ per cent. of amorphous strophanthin, a yellow oil and 13 per cent. of extractive. The epicarp contained only a very minute quantity of strophanthin. An insect and its larva lived in the interior of the seeds without apparent inconvenience. [It has been sometimes stated that the effect of strophanthus as an arrow poison is heightened by its expression whilst the living insects are within the seeds. Trans.]

ERYTHROPHLEINE. Prof. Panas in a communication to the *Académie de Médecine* March 6, 1888, (*Prog. Méd.* March 10), stated that as a local anæsthetic in ophthalmology its action was more prolonged but less complete than with chloral, while the inflammation and pain which attends its use renders it unsuitable for all eye operations; durable anæsthesia is obtained with chloral by repeating the instillations.

ASSAY OF COCA LEAVES. In the *Jour. de méd. de Bruxelles*, Mr. Koehler describes his method as follows: Mix 50 gm. of finely pulverized leaves with 5 gm. of dry carbonate of sodium and 15 gm. of oxide of lead; macerate with 50 gm. of water and dry *in vacuo* in a large vessel at the temperature of the water bath. The dried mass is agitated with 250 gm. of benzin in a large flask; in twenty-four hours filter and recommence the process with an equal quantity of the solvent. The benzin extracts are then placed in a receiver and reduced in partial vacuum to 200 gm.; the temperature of the bath should not exceed 30° to 40° [86° to 104° Fah.]. The extractive is then briskly agitated with 100 gm. of 1 to 100 HCl in water. After frequent agitation for an hour, decant and wash the benzin extract again with 50 ccm. of acidulated water as before. The cocaine is entirely dissolved by the acidulated water. To free from the coloring extractive wash the hydrochloric liquor two or three times with 20 ccm. of ether. The alkaloid is displaced by an excess of carbonate of sodium and extracted with 20 gm. of ether; after a brisk agitation the ether is decanted, and replaced by a new supply, etc. The cocaine passes wholly into the ethereal extracts. These are evaporated into the free air and the alkaloid separates, partly in long fine needles and partly in thick crusts of blended crystals. These are dried *in vacuo* over sulphuric acid and weighed. *Répert. de Pharm.* March, 1888. [See also *AM. JOUR. PHARM.*, 1888, pg. 199.]

OIL OF SESAME AND OLIVE OIL. In operating upon fat acids, says Mr. Ernest Milliau (*Moniteur Sci.*), we have been able to obtain all necessary exactitude by using the saccharated hydrochloric acid process. In acting directly on the oil we may obtain rose colorations from perfectly pure olive oil. The appearance of this tint, which has given rise to so many disputes, arises from the coloring matter in the aqueous part of the oil. In treating this part with HCl (sacch.) we obtain a rose or red coloration recalling exactly that of sesame. So,

new olive oils—however pure—may sometimes give a red color. In taking care to expel the water from the fat acids, at a heat of 110° [230° F.] and pouring them into a test tube upon an equal quantity of HCl (sacch.), the rose color is produced, whatever proportion of sesame may be present in the olive oil. But if the latter be pure, the HCl (sacch.) remains absolutely colorless. *L'Union Pharm.*, March, 1888.

INNOXIOUSNESS OF BORACIC ACID. Dr. Gaucher concludes from experiments upon animals that man would have to take 75 gm. in twenty-four hours to get its toxic effects. To several tuberculous patients he gave quantities equal to 1 gm. daily. After a few days of treatment the fetidity of the sputa disappeared, and in two cases the general condition was ameliorated. He found it beneficial in cystitis; it produced no gastric irritation. *Soc. méd. des hôpitaux; Répert. de Pharm.*, March, 1888.

GUAIACOL is recommended by Sahli (*J. de phar. d'Als-Lorr.*, January, 1888), as a substitute for creasote, owing to the uncertainty as to the purity of the latter. For its internal administration he proposes the following formula: Guaiacol, 2 gm.; alcohol, 20 gm.; water, 180 gm.; dose, from a teaspoonful to a tablespoonful two or three times a day, after eating. The mixture should be kept in black glass.

SOZOIODOL is described as a derivative of the aromatic series having the constitution of a phenol whose atoms of hydrogen are replaced by the radical (SO_2H) and an atom of iodine. It takes the form of a brilliant crystalline powder, is inodorous and dissolves sparingly in cold water and in cold alcohol. It holds 42 per cent. of iodine and is said to be equally efficacious with iodoform and salicylic acid in dermatoses. It appears to owe its only advantages to its absence of odor. *L'Union Pharm.* February, 1888.

ANTHRAROBIN, discovered by Liebermann (Berlin Medical Society) is less toxic than chrysarobin, for which several German physicians wish to substitute it. Rabbits absorb 1 gm. without inconvenience. It is eliminated by the kidneys, after changes not yet studied. Doctors who use it make topical applications (in the form of unguents) against psoriasis, herpes, pityriasis, etc., or employ it in 10 to 100 alcoholic solutions, which are preferable. The ointments consist of 10 or 20 to 100. Its efficaciousness is heightened with soap and water after

the inunctions. Applied to the scalp it turns the hair red. *Bull. Méd.*; *Arch. de Phar.*, April 5, 1888.

PHENACETINE OR PARAACETPHENETIDINE. Prof. Kast, of Freiburg, (confirmed by Prof. Bamberger, of Vienna), finds that in doses of 50 to 70 cgm. it lowers the temperature in man by 2 or $2\frac{1}{2}$ degrees. These writers say that it does not cause vomiting, cyanosis, collapsus or diuresis, and has no action upon the circulatory system.—*Arch. de Phar.*, February, 1888.

ANTIPYRINE: ITS INDICATIONS AND ITS DANGERS. At the *Société de Thérapeutique*, Feb. 22, 1888, Dr. Huchard said (*Prog. Méd.*, March 31, 1888), that in certain affections, such as typhoid fever where the kidneys serve as emunctories care must be used in giving antipyrine. On the other hand, he had given 8 gm. daily to a woman with meningo-myelitis, thus reducing the amount of urine from 24 and 28 litres in 24 hours, to 5 litres. Dr. Huchard also said that the drug should not be given in arterio-sclerosis even when the kidneys are not involved. Dr. Dujardin-Beaumetz agreed with Dr. Huchard, and said that antipyrine must not be given when the kidneys were affected, as it might become locked up in the system and cause toxic accidents. [See *Am. Jour. Phar.*, 1888, p. 180].

VANILLIC PHLOROGLUCIN, GUNZBURG'S REAGENT. This is the mixture lately adopted by Prof. Germain Sée in his researches upon the chemistry of the gastric juice, and especially upon the amount of hydrochloric acid contained in the stomach in its pathological as compared with its normal condition. In the *J. de Phar. et de Chim.*, April 1, 1888, Mr. E. Bourquelot describes the reagent as follows: To prepare it, dissolve 2 gm. of phloroglucin (isomeric with pyrogallic acid), and 1 gm. of vanillin (aldehyd of methyl-protocatechuic acid) in 30 gm. of absolute alcohol, thus obtaining a yellowish red solution. This, added to hydrochloric or other mineral acid gives a bright red reaction. When these acids are greatly diluted, as in the liquid from an impoverished stomach, the action does not take place and then a few drops of the stomachal liquid and an equal quantity of the reagent are heated in a small porcelain dish in the water bath. If HCl be present a red color shows at the sides of the capsule and increases in extent as the liquid evaporates. The action is clear with liquids containing one per cent. of the acid, and becomes brighter in proportion to the amount present.

PRACTICAL NOTES FROM FOREIGN JOURNALS.

BY THE EDITOR.

Saccharated ferric oxide.—Experiments made by W. Stromeyer, lead to the conclusions, 1, that ferric hydroxide dissolves in sugar solution in small quantity, varying somewhat with the conditions of the process; 2, that the solubility of ferric hydroxide is increased with the increase of the quantity of sugar in the aqueous solution; and, 3, that the solubility of ferric hydroxide in sugar solution is augmented by the addition of caustic potassa.

Further experiments made by Ernst Schmidt, showed that the brown granular precipitate produced by boiling water in the solution of a ferric salt, containing sugar and rendered alkaline by caustic soda, may be almost absolutely freed from sodium, but not from sugar, by washing with boiling water; and with hydrochloric acid yields a brown red solution, passing gradually into the yellowish brown of ferric chloride.

Prepared according to Hornemann's method (ferric chloride, syrup, and caustic soda, sufficient to redissolve the precipitate, then boiled), the ferric oxide varied between 62 and 71 per cent., and the Na_2O present between 0.07 and 1.11 per cent. Only two of the four products, containing about 65 per cent. Fe_2O_3 , were soluble in water; in one of the insoluble products (71 per cent. Fe_2O_3), the molecular proportion of ferric hydrate to sugar was approximately as 30 : 1.

Prepared according to the German pharmacopœia the molecular proportion was nearly as 16 : 1, in the water soluble products, containing about 68 per cent. Fe_2O_3 , and from 0.5 to 2.08 per cent. Na_2O ; in one or two of these the addition of a little alkali, besides sugar was necessary to effect complete solution, and the same was the case with a product containing 75.8 Fe_2O_3 , and 0.3 Na_2O , which became soluble in the presence of sugar after the proportion of Fe_2O_3 to Na_2O had been changed to 68 : 0.6.

It is thus shown that ferric saccharates, suitably mixed with sugar, must contain a certain amount of alkali, possibly as sodium saccharate, in order to yield clear solutions with water; the amount of Na_2O necessary for this purpose, is rather less than 1 per cent. of the Fe_2O_3 present. The chemical reactions, when following the process of the *Phar. Ger.*, may be explained thus: sodium carbonate precipitates from ferric solutions, ferric hydrate containing soda, which with NaO and sugar forms a water soluble ferric saccharate; boiling water precipitates from the solution ferric saccharate of variable composition

and soluble in water ; if by washing with water the amount of NaO has not been decreased to less than about 1 NaO for 100 Fe_2O_3 , then on the addition of sugar and drying, a water soluble ferric saccharate with excess of sugar is obtained.—*Archiv d. Phar.*, February 1888, p. 137-154.

Pure glacial phosphoric acid may be obtained from sodium pyrophosphate by treating it with fuming hydrochloric acid, spec. grav. 1.190, filtering through platinum sponge from the sodium chloride, removing arsenic by means of sulphuretted hydrogen, and evaporating in a platinum vessel. Sodium chloride is almost insoluble in hydrochloric acid of the above strength ; a weaker acid will not remove the soda.—*Zeitsch. f. anal. Chem.*, 1888, p. 24.

Salicylate of mercury is said to be prepared by precipitating mercuric nitrate with alkali salicylate, washing with water and diluted alcohol, and drying in the shade. B. Fischer describes it (*Phar. Ztg.*, 1888, p. 146), as a white inodorous and tasteless powder of neutral reaction, very sparingly soluble in water or alcohol, but soluble in solution of table salt. It is not decomposed by acetic, tartaric, lactic or carbonic acid, but mineral acids liberate salicylic acid. It contains 59 per cent. of hydrogen, and its formula is $\text{C}_6\text{H}_4\text{CO}_2\text{OHg}$. Its complete solubility in caustic soda solution may serve as a test for its purity. A solution for dispensing may be prepared by triturating 10 gm. of the salt with 15 or 20 gm. of sodium chloride dissolved in water, adding about 150 gm. water, heating in a water bath until solution is effected, and diluting with 2500 cc. hot water.

Magnesium salicylate has been recommended by Huchard in abdominal typhus as preferable to bismuth salicylate. According to B. Fischer (*Phar. Ztg.*, 1888, p. 146), the salt is prepared by dissolving salicylic acid in boiling water, saturating the solution with magnesium carbonate, filtering and crystallizing. It forms long, colorless needles, is readily soluble in water and alcohol and has a somewhat bitter taste. When given in large doses of 3 to 6 gm. daily it causes no unpleasant effects.

Impure potassium iodide, containing sulphite, has been met with in commerce by C. Daudt (*Phar. Ztg.*, 1888, p. 117). The sample responded to the pharmacopœial tests for iodate, nitrate, chloride and thiosulphate ; but the hydrogen gas evolved on testing for nitrate with zinc and hydrochloric acid, produced a black color on lead paper, due to the presence of sulphite, soluble sulphides being absent.

Liparin which has been recommended as a substitute for cod liver oil, is prepared by partial saponification of pure olive oil, and separating the excess of oil together with the liberated oleic acid. It is an oily liquid, closely resembling olive oil, contains 5 to 6 per cent. of free fat acids (oleic), and readily forms a milk white emulsion, when agitated with an equal bulk of water containing a little soda. The amount of free acid is readily determined by dissolving 2 gm. liparin in 20 cc. ether, adding 10 cc. alcohol and a few drops of phenol phthalein, and titrating with normal alkali. *Phar. Zeitung*, 1888, p. 102.

The properties of different kinds of malt have been studied by T. Morawski and M. Glaeser (*Chem. Repert.*, March 4, 1888, p. 58), with the following results: 1. Rye malt has a much greater saccharating power than oat malt. 2. Wheat malt is of the same, if not of greater, value as rye malt. 3. The saccharating power of rye and wheat malt is but little inferior to that of barley malt, and in several instances was found to be of the same value. 4. Oat malt is inferior in saccharating power to malt from the other grains. 5. Maize malt, made at the ordinary temperature, is inferior to oat malt; if prepared at 30°C., and until the germ has twice or thrice the length of the corn, the saccharifying power is materially enhanced, and becomes equal to that of oat malt.

A color-changing varnish, patented in Europe, consists of a solution of platino-magnesium cyanide, to which gelatin, gum, or similar fixing material, has been added. The articles coated or impregnated with this solution, after drying by a moderate heat, retain their original color until exposed to moist atmosphere, when a rose or red color, modified by the natural color of the article, makes its appearance, and remains permanent, until exposed to heat.—*Chem. Zig.*, 1888, p. 319.

Chloride of Methyl, according to Dr. Bailly (*Prog. Méd.*), may sometimes be used to great advantage by receiving the spray upon a tampon of non-absorbent cotton. This material holds and preserves the refrigerant activity of the medicament so that it exerts its power with great regularity and constancy.

Borate of Ammonium in Phthisis.—Professor Lashkevich attaches a great deal of importance to this salt as a remedy in the treatment of phthisis. It diminishes the expectoration, and very frequently cuts short the fever in the first stages of the disease. The dose is about 25 centigrams, given three times a day with the addition of codeine or some other sedative.—*Weekly Med. Rev.*

GLEANINGS FROM THE GERMAN JOURNALS.

BY JOHN A. MARTIN, PH. G.

Sulphobenzoate of Sodium recommended as an antiseptic dressing for wounds, is prepared by dissolving benzoic acid in a concentrated solution of sulphite of sodium. The compound is very soluble in water, and is an antiseptic worthy of notice on account of its entirely non-poisonous and odorless character. A four per cent. or five per cent. solution in water used as a lotion or dressing for wounds acts not only as a disinfectant, but also hastens granulation.—*Rundschau*, Prag, 1888, p. 13.

Test for the Purity of Cocaine.—Dissolve 1 gm. of hydrochlorate of cocaine in 5 gm. of water and add to the clear solution 3 drops of diluted sulphuric acid, (*Phar. Ger. II.*) Now add 1 drop of a one per cent. solution of permanganate of potassium. The violet color of the solution must remain plainly visible for half an hour; an impure cocaine salt will at once decolorize one or more drops of the permanganate solution. It is necessary to have the vessel in which the test is made well covered, to protect the solution from dust.—C. F. Bøehring, in *Pharm. Post*, 1888, p. 136.

Guarana.—To ascertain the amount of caffeine in guarana, A. Kremel recommends the following method: Digest 10 gm. of powdered guarana with 100 gm. of 25 per cent. alcohol, in a tared flask on a water bath, for 1 or 2 hours. After cooling replace the loss of weight with 25 per cent. alcohol, thoroughly shake the mixture, and filter off 50 grams. Add a sufficient quantity of slaked lime to the filtrate, and evaporate to dryness in a porcelain capsule. The residue is reduced to fine powder and extracted with chloroform. Upon evaporating the chloroform solution the caffeine is obtained in absolutely colorless crystals. The crystals are dried at 100° C. and weighed. By this method guarana of commerce yields from 3.12 to 3.80 per cent. of pure caffeine.—*Pharm. Post*, 1888, page 101.

Adulteration of Cod-liver Oil—Professor Poel of St. Petersburg reports an adulteration of cod-liver oil with 50 per cent. of mineral oil, and although it contained this large amount of mineral oil suspicion was not aroused by the appearance or taste. The stools of patients had the odor of petroleum, and this led to the discovery.—*Wratch*; *Pharm. Post*, 1888, page 37.

Santonin Lozenges.—A correspondent to *Journ. de Pharm. d'Anvers*, made an examination of several samples of santonin lozenges, obtained principally from the lozenge manufacturers of Belgium. The process

is a very simple one: 10 lozenges are reduced to a fine powder and digested with chloroform in a small flask for half an hour. The chloroform solution is then filtered, the residue upon the filter washed two or three times with chloroform, and the solutions evaporated with the aid of a gentle heat. The santonin remains in a pure crystalline state. According to the Codex each lozenge should contain 25 milligrams of santonin, but the examination showed that not one of the samples contained more than 10 milligrams in each lozenge.—*Pharm. Post*, 1888, page 27.

Pasta Mack is a new toilet preparation which dissolves in water with evolution of carbonic acid gas, and is said to produce an agreeable and refreshing effect upon the skin. According to Eckstein in *Berl. Pharm. Ztg.*, it is composed of a mixture of 27 parts rice starch and 73 parts effervescing powder, (bicarbonate of sodium 10, tartaric acid 9), suitably perfumed and formed into small tablets. The perfume imparted to the water is strong and agreeable and remains upon the skin long after washing.—*Rundschau*, *Prag*, 1888, p. 12.

Listerin.—The antiseptic solution used in England and America under this name, according to "Fortschritt," has the following composition :

Acid benzoic,.....	8.0 gm.
Borax,.....	8.0 gm.
Acid boric,.....	16.0 gm.
Thymol,.....	2.4 gm.
Eucalyptol,.....	10 drops.
Oil gaultheria,.....	10 drops.
Oil Menth. pip.....	6 drops.
Oil Thyme,.....	2 drops.
Spt. Vin. rect.....	180.0 gm.
Aqua sufficient for.....	1000.0 gm.

Russian Chilblain Ointment.—Beef marrow 40 parts, hydrochloric acid 30 parts, marshmallow ointment 120 parts, extract of opium 2.5 parts, camphor 10 parts, and Venice turpentine 25 parts.—*Phar. Centrallh.* 1888 p. 12.

Flashpowder, (Blitzpulver) used in photography for taking instantaneous pictures, is made by mixing together coarsely crushed sugar 1 part, magnesium, in powder, 1 part, chlorate of potassium, 2 parts. This powder, according to Harvey, in *Pharm Ztg.*, is one of the best for this purpose, but care must be taken that the sugar is not in fine powder, as otherwise the explosions will be too violent. In

another formula Borlinette recommends equal parts picric acid and chlorate of potassium. This is cheaper than the first, but it is more dangerous and must be used with care.—*Rundschau, Prag*, 1888, p. 91.

To file glass vessels.—Bornträger in *Rep. anal. Chem.*, recommends to first lay the file in a strong soda lye and while yet wet to dip it into coarse sand. A file treated in this way can be used for filing glass ware, without the least danger of cracking it.—*Rundschau, Prag*, 1888, p. 91.

Liquid glue, possessing great resisting power, and particularly recommended for wood and iron, is prepared according to Hesz as follows: Clear gelatin, 100 parts; cabinet-maker's glue, 100 parts; alcohol, 25 parts, and alum, 2 parts; the whole mixed with a 20 per cent. acetic acid, and heated on a water-bath for six hours. An ordinary liquid glue, also well adapted for wood and iron, is made by boiling together for several hours 100 parts glue, 260 parts water, and 16 parts of nitric acid.—*Rundschau, Prag*, 1888, p. 74.

Iodine Pastilles, for disinfecting the sick room, are prepared by incorporating iodine and salicylic acid with paraffin or wax, or similar material. In burning the pastilles, the salicylic acid is converted into phenol, and this is volatilized with the iodine.—*Rundschau*, 1888, p. 50.

A general antidote for poisons is a mixture composed of equal parts of calcined magnesia, wood charcoal, and hydrated oxide of iron, with a sufficient quantity of water. It is, as a harmless and simple remedy, applicable in such cases when the nature of the poison is unknown.—*Rundschau*, 1888, p. 15.

As an antidote for iodoform, Behring recommends a 20 per cent. solution of bicarbonate of sodium.—*Rundschau*, 1888, p. 15.

Corrosive sublimate in external applications.—Recently in a report before the Medical Society of Berlin, Professor Virchow called attention to several cases of corrosive sublimate poisoning; he had already in November reported several cases in "Charité." Patients who had used for disinfecting purposes external applications of corrosive sublimate suffered serious derangement of the intestines from which they died. The real cause of death was ascertained only after making chemical examinations of the affected organs, which revealed the presence of mercury, and this could only be traced to the corrosive sublimate which had been used externally. Since the foregoing, Professor Virchow observed three more cases of fatal poisoning from corrosive sublimate.—*Ap. Ztg.*, 1888, page 13.

JOTTINGS FROM A NOTE BOOK.*

BY JOS. F. BURNETT, F. C. S.

Pharmaceutical Chemist.

Sugar as an Alkaloid Reagent.—I have recently had my attention directed to sugar as an alkaloid reagent and have tried a number of experiments to show how useful it is. With codeine, morphine, and veratrine the reactions with sugar and sulphuric acid are highly characteristic. Apply the test thus: Mix a trace of the alkaloid with about an equal quantity of powdered cane sugar upon a white plate, and then drop on a drop or two of strong sulphuric acid by means of a glass rod. Morphine turns light pink; codeine a deeper pink; veratrine becomes dark red, then in a few moments green, changing again to a rich dark blue. With aconitine the behavior is peculiar. It develops an orange color, after a time becoming pink in the case of exotic aconitines; but with crystallized English samples the result is such that no dependence can be placed upon it. Negative results were obtained with the following alkaloids: Quinine, quinidine, cinchonine, cinchonidine, caffeine, berberine, physostigmine, strychnine, cocaine, pilocarpine, atropine, apomorphine, brucine, and cupreine.

Bismuth with Mucilage.—A recent writer in the *Pharmaceutical Journal* in some dispensing notes lays down as an axiom, that when bismuth is ordered in a mixture mucilage must be added by the dispenser to suspend it. To this I cannot but take exception, for the following reasons: A mixture containing bismuth and tragacanth was made in some quantity by myself last summer, and however carefully made or however elegant its appearance when made, in the course of a few days the bismuth had set at the bottom of the bottle, and no amount of shaking would again diffuse it. In fact, one might as well turn a few feet of cord into a bottle full of water and attempt to diffuse that. When tried with mucilage of acacia the result was not one bit more satisfactory. I would therefore maintain that a bismuth mixture is much the better in the long run without gum at all, and no medical man who foresaw such a result as I have laid before you would be likely to order it. Is, then, the dispenser justified in spoiling a mixture which has to be kept a week simply for the sake of the appearance it may bear for the first day? If a suspender be desired, I can

*Read before the Chemists' Assistants' Association, March 29, reprinted from *Phar. Jour. and Trans.*, April 7, 1888, p. 854.

give glycerin my unqualified approval, for I have used and am using any amount for this purpose, and I always find it all that can be desired. Of course, I do not suggest the addition of glycerin where the practitioner has not prescribed it, for I would dispense his mixture as written.

Laburnum Poisoning.—It may be interesting to chronicle a case I met with last autumn while making some house-to-house calls in one of the poorer localities of Oxford. Two or three children were lying about the room sick with headaches, pains in the stomach, and drowsiness. The mother had elicited from the elder that they had eaten some seeds which they had picked up in a neighbor's garden. I asked to see some of the seeds, and a withered branch of what I at once knew to be laburnum was brought to me, with plenty of fruit upon it. As far as could be made out from the tales of the children, they had swallowed some five or six seeds each. The mother had had the good sense to encourage the sickness with mustard, and afterwards gave strong stimulants in the shape of tea and coffee, and in two or three days the children were well again. I only mention this hoping that by it the poisonous property of that common ornamental shrub may be the more widely spread, and thus parents be put upon their guard. In this instance the woman had not the slightest previous knowledge that laburnum was poison.

Chloroform as a Preservative.—Anyone who has to get through a large amount of dispensing in a short time has his ingenuity put to work to devise every means he can to expedite his work. One of the first and most natural ideas is to keep every drug or chemical (which is likely to be required) in solution. I now keep large numbers of dispensing solutions, in fact many more than ever I previously did. Then crops up the difficulty that many soon spoil, ferment, develop fungoid growths, etc., etc. Where such is the case I use chloroform water, B.P., for the solvent and in not a single instance have I found it fail to keep the solution perfectly. I may note in passing that I have the permission of the medical staff to use any such device as this, for the dose of chloroform introduced into a mixture by adding *e.g.*, 80 minims of a 1 in 10 solution of quinine is neither here nor there. I have by me quantities of pulv. rhei rubbed down with aq. chlorof., likewise pulv. cret. aromat., solutions of quinine, fer. am. cit., pot. acet., pot. citr., and a host of others, some of which are some months old, and are as good as the day they were made. A couple of drachms of chloro-

form will keep for a fortnight as much as three gallons of fresh infusion of gentian. Infusions of calumba or buchu made four times the strength of the B.P. (i. e., conc. 1 to 3) keep perfectly when one drachm of chloroform to the quart is dissolved in them. With infusion of buchu I consider this a distinct advance on using spirit (which the 1 to 7 preparation of the wholesale houses contains), for the chloroform does not throw down any mucilaginous constituent. These are but a few examples of the use of chloroform as a preservative.

Salicylic Acid.—It will be remembered that I have previously published some work on this subject, wherein I stated that the artificial acid reduced a dilute solution of potassium permanganate much more rapidly than that obtained from wintergreen. In the discussion that ensued, it was hinted that my experiments were incomplete, because I had not tried Schering's dialyzed acid in this way, and this must be my apology for raising the ghost again. I promised at that time to experiment and let the Association know the result; but I have never yet done so. Allow me now to say that Schering's acid differs but little from Kolbe's in its reducing action upon permanganate, as the following experiments show:

Four samples of the acid as follows:

- a.* Natural acid.
- β.* Schering's dialyzed acid.
- γ.* Kolbe's acid.
- δ.* An artificial acid of unknown source.

Three grains of each were mixed with two drachms of distilled water and ten minims of B.P. liq. pot. permang. added to each. At the end of fifteen minutes *β*, *γ*, and *δ*, were ever so many shades lighter than *a*, and at the end of an hour the difference was extremely well marked. After an hour and a half *a*, on being gently agitated, was of a dark olive brown color; *β*, *γ*, and *δ* were of a light brownish-green *γ* and *δ* being identical, and *β* only just the least shade darker.

This result is quite independent of anything I have previously published, and it does but confirm the opinion I have previously expressed that there is no synthesized acid in the market which is chemically identical with the natural.

Phthalate of Morphine, according to Bombelon is a highly serviceable salt of morphine, soluble in 5 parts of water, and causing no irritation when injected subcutaneously. It is obtained by evaporation and scaling, not by crystallization, and care is necessary in its preparation.

ACTION OF WATER ON LEAD.*

BY M. MÜLLER.

A sample of water from the Ocker was distilled. The amounts of dissolved gases and of ammonia were determined in the first, middle, and last fractions, and the behavior of the different fractions with lead observed. The water before distillation contained 0.00015 per cent. of ammonia.

	First fraction.	Middle fraction.	Last fraction.
Ammonia,	0.00115 p. c.	0.0001 p. c.	0.00008 p. c.

Dissolved gases reduced to 0° and 760 mm. pressure.

Total volume,	2.04 vol. p. c.	1.196 vol. p. c.	0.77 vol. p. c.
Carbonic anhydride,	1.159 "	0.178 "	0.025 "
Oxygen,	0.269 "	0.316 "	0.232 "
Nitrogen (diff.)	0.612 "	0.702 "	0.513 "

The first fraction scarcely attacked polished strips of pure lead, which became slowly covered with a thin deposit. The water remained perfectly clear. The middle and last fractions acted very energetically, the lead was rapidly corroded, and the water became turbid. In order to ascertain whether the protecting influence of the first fraction was due to the ammonia or the carbonic anhydride it contained, well water, perfectly free from ammonia, was distilled, and the amount of gas dissolved in different portions of the distillate was ascertained.

	First fraction.	Middle fraction.	Last fraction.

Dissolved gases reduced to 0° and 760 mm. pressure.

Total volume,	2.661 vol. p. c.	1.312 vol. p. c.	1.047 vol. p. c.
Carbonic anhydride,	2.030 "	0.218 "	0.069 "
Oxygen,	0.198 "	0.358 "	0.341 "
Nitrogen (diff.),	0.433 "	0.738 "	0.637 "

In this case also the first fraction showed scarcely any action on lead, after remaining in contact with it for 24 hours. The middle and

* *J. pr. Chem.* [2], xxxvi, 317—340. Reprinted from *Jour. Chem. Soc.*, 1888, p. 225.

last fractions attacked it with considerable energy. The protecting influence of the first fractions must be considered as due to their containing a relatively large quantity of carbonic anhydride. Distilled water, which was vigorously boiled for some time and quickly cooled in contact with air, was found to contain 0.04 per cent. of its volume of carbonic anhydride, 0.236 per cent. of its volume of oxygen, and 0.514 per cent. of its volume of nitrogen. The rapid absorption of these gases explains the behavior of water so treated towards lead. Distilled water, quite free from carbonic anhydride but containing oxygen, scarcely acts on lead, but on exposure to the air the liquid becomes cloudy, owing to the formation of a white precipitate.

Samples of water containing different amounts of carbonic anhydride, but an invariable quantity of oxygen, behave very differently with lead. In one case, when the oxygen present was 0.35 per cent. of the volume of the liquid, and a saturated solution of carbonic anhydride was added until the water contained 0.14 per cent. of its volume, the lead was appreciably attacked. On increasing the carbonic anhydride to 0.6 vol. per cent., the attack became remarkably energetic. With 1 vol. per cent. the action was considerably weaker, and when the carbonic anhydride was increased to 1.5 vol. per cent. the lead was no longer visibly corroded. Water containing 2, 2.5, and 3 vols. per cent. of carbonic anhydride was equally inactive. Water containing carbonic anhydride but no oxygen is practically without action on lead, when atmospheric air is excluded. When strips of lead are immersed for eight days in pure distilled water, recently boiled and cooled out of contact with the air, they do not become tarnished. Before filtration, however, but not after, the water gives a considerable reaction with hydrogen sulphide. Pure water evidently attacks lead with formation of an oxide. Ordinary distilled water in which strips of lead were placed, and from which the air was excluded, contained a maximum quantity of lead at the end of three days, after which the lead was by degrees thrown out of solution. This is explained by supposing that water containing carbonic anhydride and oxygen in contact with lead forms lead carbonate, which dissolves in the excess of the gas; but as more lead oxide is formed, this carbonic anhydride is absorbed, and all the lead falls out of solution as lead carbonate. Distilled water, free from carbonic anhydride, to which minute quantities of ammonia have been added, attacks lead, but is without action on it if carbonic anhydride is present.

Lime water, through which a current of air, perfectly free from carbonic anhydride, was passed, at first slowly dissolved lead, but this was soon again thrown out of solution in the form of minute crystals. The solution attained a maximum after 13 hours, and then decreased. Sodium hydroxide solution behaved in a similar way. In the absence of oxygen, neither lime-water nor sodium hydroxide solution attacked lead. Lead tubing, buried in mortar, and kept in a dry room for a year suffered no change, but when the mortar was occasionally moistened with pure water, corrosion rapidly took place. When soapy water or an alkaline solution of lime was used instead of pure water, the decomposition-products consisted to some extent of red lead.

Ordinary distilled water, to which a small quantity of sodium carbonate was added, dissolved no lead, but the metal became slowly covered with a white, compact coating. When the water contained oxygen but no carbonic anhydride, lead was found in solution after a few hours. A trace of sodium hydrogen carbonate added to distilled water completely prevented the dissolution of lead, and the metal became covered with a protecting crust. Waters containing lead in solution were found to be freed from it by adding sodium carbonate. Pure lead carbonate is soluble in water containing carbonic anhydride; it is reprecipitated by boiling the solution or by adding hydrogen sodium carbonate to it. Evidently lead forms an acid carbonate, which is soluble in water but possesses little stability. Hydrogen calcium carbonate acts in precisely the same way as hydrogen sodium carbonate.

Polished strips of lead immersed in a saturated solution of pure calcium sulphate, containing oxygen, become covered with a hard, white coating, but no lead goes into solution. In the absence of oxygen, the metal remains perfectly bright. On placing lead covered with the white crust formed by long immersion in a solution of calcic sulphate, in pure distilled water, no lead went into solution except when a considerable quantity of carbonic anhydride was present. When a trace of hydrogen calcium carbonate was added to the solution, in no case was any lead dissolved. The coating is in all probability a basic sulphate of lead.

The presence of minute quantities of chlorides, nitrates, organic matter and ammonia in water, did not influence its behavior towards lead. This seems to depend on the presence of oxygen and carbonic

anhydride. Water containing much organic matter, and rich in carbonic anhydride, rapidly corrodes lead, but polished surfaces of the metal remain perfectly bright when immersed in pure solutions of organic compounds, such as starch and sugar, provided no carbonic anhydride is present.

BISMUTH IODIDE.

By B. S. GOTT, B.A., and M. M. PATTISON MUIR, M.A.

It is known that bismuth iodide, BiI_3 , may be prepared either by heating together bismuth and iodine in the ratio $\text{Bi} : 3\text{I}$, or by adding an aqueous solution of potassium iodide to a solution of bismuth nitrate in dilute nitric acid. The directions given by earlier experimenters for preparing this compound in the wet way are vague. We have recently made some experiments on the preparation of bismuth iodide, and also on the comparative stabilities towards water of this compound, according as the specimen is prepared in the dry or the wet way.

Preparation of Bismuth Iodide in the Wet Way.—Excess of a fairly concentrated aqueous solution of potassium iodide is added to bismuth nitrate dissolved in the smallest possible quantity of dilute nitric acid; BiI_3 is thus precipitated along with iodine. The precipitate is dissolved in as small a quantity as possible of concentrated aqueous hydriodic acid, and water is added until the greater part but not the whole of the bismuth is precipitated as brown BiI_3 . The solid matter is collected and dried for some time at 100° , whereby most of the free iodine is volatilized. The residue is then washed once or twice with absolute alcohol, and finally dried at 100° .

Some Properties of Bismuth Iodide.—The salt prepared as described above is somewhat soluble in absolute alcohol: 100 parts by weight of alcohol at 20° dissolve about $3\frac{1}{2}$ parts of the salt.

The sp. gr. of BiI_3 prepared in the dry way was found to be 5.64; and the sp. gr. of BiI_3 prepared in the wet way to be 5.65 at $\frac{20^\circ}{20^\circ}$.

Specimens of the iodide prepared in both ways were treated with water in about the ratio $\text{BiI}_3 : 3000\text{H}_2\text{O}$, for different times and at different temperatures; the amount of decomposition to BiOI and HI

was determined by measuring the quantity of hydriodic acid produced at the expiration of fixed times. The results were as follows :

	BiI ₃ prepared in the dry way.	BiI ₃ prepared in the wet way.
Temperature=26°—		
After 30 minutes' action.....	17.5 p. c. decomposed	17.7 p. c. decomposed
“ 60 “ “	19.8 “	19.2 “
“ 150 “ “	24.4 “	23.9 “
Temperature 60—65°.		
After 30 minutes' action.....	22.5 “	20.1 “
“ 60 “ “	25.4 “	25.1 “
“ 150 “ “	30.7 “	33.9 “
Temperature=100°.		
After 30 minutes' action.....	22.75 “	23.6 “
“ 60 “ “	27.4 “	29.9 “
“ 150 “ “	35.1 “	35.4 “

There is therefore no appreciable difference between the rate of decomposition by water of the two specimens of bismuth iodide.—*Jour. Chem. Society*, 1888, p. 137.

REDUCING AND OXIDIZING PROPERTIES OF BACTERIA.¹

By W. HERAEUS.

The author prepared pure cultivations of the various bacteria (*Bacilli* and *Micrococci*), which occur in river water, in spring water and in soil, and also of the mould fungi (*Mucor* and *Aspergillus flavus*). Besides ash constituents, the nutrient liquids contained either ammonium carbonate or calcium nitrate or carbamide. There were found (besides those bacteria that would not grow in artificial liquids) two species which reduced nitric acid to nitrous acid and ammonia, and converted carbamide into ammonium carbamide; one species which made use of nitric acid without reducing it to nitrous acid, and which changed carbamide into ammonium salts; one species which behaved similarly with nitric acid, but did not change carbamide into ammonium compounds; one species which gave no indications of action on nitrogenous substances; one species which left nitric acid unaltered but changed carbamide into ammonium salts; and lastly two mould fungi which gave no indications of action on nitrogenous substances.

¹ *Bied. Centr.*, 1887, 783—784. Reprinted from *Jour. Chem. Soc.*, 1888, p. 313.

No species of bacteria were found which had an oxidizing action; but some micro-organisms were obtained from soil infusion and from putrefying urine which converted the nitrogenous matter of both ammoniacal and urine solutions, and of diluted meat-infusion into nitrous acid.

Further, an examination for oxidizing properties was made with various known species of bacteria; namely, the hay bacillus, *Micrococcus prodigiosus*, Finkler's bacteria; also with the pathogenic ones, namely, those of anthrax and typhus, *Tetragonus* and others. In solutions containing sugar and the ash constituents, almost all of them were devoid of any perceptible growth; whilst in urine diluted with four times its bulk of water, *Micrococcus prodigiosus*, root-shaped bacteria, the spirillum of cheese, Finkler's bacteria, those of cyphus and anthrax and *Staphylococcus citreus*, succeeded in forming nitrous acid. Hay bacillus, *Staphylococcus aureus*, and the bacteria of green pus and of pneumonia produced a thick turbidity but no nitrous acid. Brieger's bacteria had a feeble oxidizing action, and the experiments with Miller's bacteria gave a negative result.

RATE OF OXIDATION OF CARBON COMPOUNDS BY POTASSIUM PERMANGANATE.¹

By DREYFUS.

When the oxidation of carbon compounds by potassium permanganate reaches its limit, the quantities of oxygen absorbed by equal weights of different compounds are not identical, but are of the same order of magnitude. When, however, the action is restrained, and the rate of oxidation is measured, the results vary widely with different compounds.

The reagents employed consist of a potassium permanganate solution equivalent to a solution of 0.1 gram of crystallized oxalic acid per litre, and a solution of indigocarmine, 10 cc. of which was equal to 5 cc. of the permanganate. A 1 per cent. solution of ethyl alcohol was used as a standard liquid, and all the other solutions were compared with it, the rate of oxidation of ethyl alcohol being taken as unity. 50 cc. of the alcohol solution was placed in a cylinder, and an equal volume of the solution to be examined in another cylinder, 25 drops of sulphuric acid was added to each, and after two minutes 10 cc. of

¹ *Compt. rend.*, CV, 523-525, reprinted from *Jour. Chem. Society*, 1888, p. 24.

potassium permanganate. The cylinders were allowed to remain in diffused light at about 15° , and 10 minutes after the permanganate had been added to the alcohol, the latter was run into 10 cc. of the indigocarmin solution until the color of the latter changed to yellow. Two minutes later, the other solution was treated in the same way. A simple calculation gives the quantity of oxygen absorbed by each substance under conditions which are strictly comparable, except that the weights of the substances are not identical. The second solution is diluted to a suitable extent, and after two or three comparative experiments, it is easy to calculate the amount of water to be added to the second substance, in order that the quantity of oxygen absorbed may be the same in both cylinders, and from this we get the weight p of the substance which will absorb as much oxygen in a given time as 1 gram of ethyl alcohol. If the two numbers 1 and $\frac{1}{p}$ are not actually

proportional to the rates of oxidation of equal weights of the two substances, they are of the same order, and may be regarded as coefficients of the relative rates of oxidation of the various compounds.

A large number of substances were examined, and the rates of oxidation vary from 0.2 in the case of saccharose to 10,000 in the case of pyrogallol; next in order to pyrogallol comes catechol, quinol, and resorcinol, with 5000, 3333, and 2000 respectively, phenol 786.0, α -naphthol 769.00, and β -naphthol 666.0. Hydrocarbons, sugars, alcohols of the ethyl series, and acids of the acetic and benzoic series, have much lower rates, varying from 1.0 to 6.0. Ether and alcohol show identical velocities.

Determinations of the rate of oxidation may be used to determine the class to which a substance belongs, and also to detect impurities in such compounds as acetone. The constitution of compounds affects the rate of oxidation more than their composition. Other conditions being the same, a saturated compound is less active than a non-saturated compound. Substances of the same chemical function show comparable rates of oxidation. The aldehyde function is more active than the alcoholic, and the phenolic function shows a very much greater activity. The rates of oxidation of isomerides are not the same. In the case of the dihydroxybenzenes and the toluidins, the ortho-derivative absorbs the most oxygen, and the meta-derivative the least, the para-derivative occupying an intermediate position.

ON THERAPEUTIC SUBSTITUTES FOR CHRYSAROBIN.¹

By C. LIEBERMANN.

In 1878 it was shown by me and Seidler (AM. JOUR. PHAR., 1879, p. 80), that the active principle of Goa powder is not chrysophanic acid, but *chrysarobin*, in which the quinone-group of chrysophanic acid is partly reduced, in consequence of which chrysarobin combines readily with oxygen, particularly when in alkaline solution, a behavior which is also observed with an alkaline solution of pyrogallie acid. At that time it was already pointed out that the remedial effects of Goa powder were probably not due to the chrysophanic acid produced from chrysarobin by oxidation; but most likely to the reducing action of the latter, to its strong affinity for oxygen. The effects of pure chrysophanic acid do not appear to have been studied, but its congener alizarin was, in 1878, shown by Jarisch to be of no value in psoriasis, while pyrogallol has a very decided effect. Jarisch was led to the use of the latter on account of its constitution, it being a polyatomic phenol; but he acknowledges the probability of its efficacy being mainly due to the affinity for oxygen.

The leuco-substances of many coloring matters closely resemble chrysarobin in the property of absorbing oxygen; but nearest to it in their constitution are the leuco-bodies of the anthraquinone coloring matters alizarin, flavopurpurin, anthrapurpurin, anthragallol and others. Granting the correctness of my view, it was to be expected that these leuco-bodies should possess remedial properties similar to those of chrysarobin. For therapeutic purposes only such deserved to be considered which may be readily prepared on a large scale, and among these alizarin and the two purpurins are obtainable at a relatively low price.

The reduction of these color-compounds was first effected by boiling with glacial acetic acid and granulated tin, with the successive addition of small quantities of fuming hydrochloric acid to effect a brisk evolution of hydrogen; a light yellowish solution is finally obtained, which is filtered, boiling hot, from the tin, and then precipitated with water; the reduction product is collected upon a filter, well washed with acidulated water, freed from the acid and dried upon earthen plates. This process requires some experience to avoid resinification of the product. On this account and because of the high price of the

¹ Abstract of a paper in *Berichte d. d. Chem. Ges.*, 1888, p. 447-452. J. M. M.

glacial acetic acid, it is better to effect the reduction by means of zinc dust and ammonia, which have been previously employed for similar purposes by Perger, Bollert and others; after boiling for fifteen minutes, the ammoniacal solution is filtered into hydrochloric acid, and the leuco-substances, after collecting, washing and drying, are thus obtained sufficiently pure for therapeutical use.

The first experiments were made with the reduction product of pure flavopurpurin, and after its efficacy was ascertained, the corresponding product of pure alizarin was prepared and found to be equally efficient; it does not, therefore, appear to be necessary for the purpose in view to keep these two coloring matters absolutely separate, and the subsequent experiments were made with commercial alizarin and purpurin.

The reduction product of alizarin had been prepared in 1881 by Römer, who named it desoxyalizarin; but neither this name, nor the collective name of anthranols, for such a group of compounds, seems quite appropriate, and it is proposed to call them *anthrarobins*, in view of their derivation from anthraquinol colors, and of their chemical and therapeutical relation to chrysarobin. The product obtained from commercial alizarin will be designated as *anthrarobin*, while those prepared from the commercial purpurins will be distinguished by prefixing the letter *p* or *f*.

Commercial anthrarobin is a yellowish white powder, permanent in the air, insoluble in water and dilute acids, but readily soluble with a brown yellow color in dilute solutions of alkalies and alkaline earths, the solutions in contact with oxygen passing through green and blue finally into alizarin violet. This change of color is best observed by agitation of the dilute solution in a test tube held over white paper; if from 0.25 to 0.5 gm. of the substance, together with some alkali solution, be thus agitated in a test tube closed by the thumb, a diminution of pressure in the tube will be observed.

Anthrarobin dissolves with difficulty in benzol and chloroform; but in glacial acetic acid and in alcohol it is much more soluble than chrysarobin. It required 5 parts of 90 per cent. alcohol for solution in the cold, the liquid being of a brown yellow color; hot alcohol dissolves it instantly. Long continued boiling causes decomposition; but the cold alcoholic solution may, in a well-corked vial, be kept for weeks with but slight alteration. The compound is also soluble in glycerin, and the alcoholic solution may be diluted with glycerin with-

out precipitation taking place. Commercial anthrarobin contains a trace of zinc, but the ash amounts only to one-third per cent.

Dr. G. Behrend has used anthrarobin for herpes tonsurans, pityriasis versicolor, eczema marginatum and psoriasis, effecting cures in 14 cases. He regards it as somewhat less efficacious than chrysarobin, but more so than pyrogallol; it colors the skin slightly brown, but does not produce inflammation, and may be employed in the face; the stains on clothes are removed with the aid of soap and soda.

The new remedy has also been used by Professor Dr. Köbner with favorable results in psoriasis, pityriasis and papulous syphilis.

PHYSIOLOGICAL ACTION OF SANTONIN AND ITS DERIVATIVES.¹

BY F. COPPOLA.

One per cent. solutions of santonin, of photosantonin, and of isophotosantonin in olive oil, at 38°, do not kill the *ascarides lumbricoidi* of the pig. Whilst, however, the two first-named substances increase the movements of the animal and cause convulsions, with isophotosantonin the reverse is the case. The other santonin-derivatives examined resemble the two first in their action on the worms. It was also found that doses of 1.25 grams of santonin daily administered to the pig did not kill the worms. The action of santonin on worms resembles its action on vertebrate animals. In order to lessen the toxic effects of the drug on the animal to which it is given it is advisable to use santoninoxime (Cannizzaro, *Rend. R. Acc. Lincei*, 1885, 703), which is insoluble in water, easily soluble in oils and fats, but not in organic acids, nor is it acted on by the gastric juice. The increased activity of the worms leads to increased peristaltic action of the intestine, which thus voids them. In the urine, santoninoxime passes out slowly as santonin; it is less poisonous than santonin, but is equally efficacious in its action on the parasites.

Experiments were also performed in order to see whether the photosantonin-derivatives differed in their action from that of santonin, and also to discover if any relation existed between physiological action and the power of solutions of these compounds to rotate the plane of

¹ *Chem. Centr.*, 1887, 1206, 1208—1209, 1301—1302; from *Rend. R. Acc. Lincei* [4], iii, 513—521, 573—578. Reprinted from *Jour. Chem. Soc.*, 1888, p. 310.

polarized light. *Photosantonio acid*, $C_{15}H_{22}O_5$, has a narcotic action on frogs, doses of 0.02 to 0.03 gram abolishing first voluntary movement, then the movements of respiration; the heart and reflexes are but little affected: doses of 0.04—0.06 gram first diminish, and then abolish reflexes, and stop the heart in diastole. In vertebrate animals the action is similar, except that the reflexes are not affected. *Photosantonin*, $C_{17}H_{24}O_4$, acts in the same way, but on account of its smaller solubility the effects are not so marked. *Santonin*, $C_{15}H_{18}O_3$, itself, and sodium santonate cause as their chief symptoms convulsions; it seems then that the action of light is to modify the physiological action of these compounds on the nervous system; the action on the respiratory and circulatory systems is, however, the same. *Santonio acid*, $C_{15}H_{20}O_4$, in doses of 0.03 gram, causes no effect in frogs; 0.04 to 0.05 gram produces narcosis, abolishes respiratory movements, but does not lessen reflexes. Larger doses affect the reflexes and kill the animal; if the dose is not lethal, the animal experiences clonic convulsions like those produced by santonin, as the narcosis passes off. In a rabbit of 1 kilo. body-weight, doses of 1 to 1.5 gram applied hypodermically have no effect: 2 to 3 grams caused sleep in $\frac{1}{2}$ to 1 hour, and, like santonin, epileptic convulsions. There is no action on the circulation, except with lethal doses, which stop the heart in diastole: atropine does not antagonize this action; this acid thus produces the effect of santonin combined with that of the photo-compounds, both narcosis and convulsions. Santonio and isosantonio acids act like photosantonio acid. Isophotosantonin, $C_{17}H_{24}O_4$, is no hypnotic, but easily causes strong convulsions. Isophotosantonio acid, $C_{15}H_{22[4]}O_5$, acts similarly, but is weaker. The derivatives of santonin that cause convulsions do so by their action on the medulla, not on the spinal cord. The photo-derivatives contain, like santonin, a closed naphthalene nucleus, and the differences in their constitution are to be found in the side-chains. There was found to be no connection between physiological action and the direction or amount of rotation of the plane of polarized light.

Nutrient Enemata—Physicians will generally indorse the conclusions of Professor Ewald, of Berlin, who has recently made some experiments with different nutrient enemata, and has found that enemata of eggs were of decided service, and that they were as efficient and satisfactory without being peptonized as when they were subjected to this process.—*Louise. Med. Herald*, April, 1888.

NOTES ON GAMBIER.*

The shrub *Uncaria Gambier* was first described by Rumphius, but attention to its practical application originated with Dr. Campbell, one of the earliest medical officers stationed at Bencoolen. This gentleman made a study of the useful plants of his district, and was very anxious that a trial of the tanning powers of gambier should be made. After mentioning that gambier was chewed by the Malays with *pinang* and *siren*, Dr. Campbell thus describes the methods of preparing it for consumption. "The young shoots and leaves are shred and bruised in water for some hours until a feculum is deposited ; this is inspissated in the sun to the consistence of a paste, is thrown into moulds of a circular form, and it is in this state the gambier is brought to market." Substitute boiling in an iron pan for inspissation in the sun, and there is not any really great difference between the primitive principle described by Dr. Campbell, and that of to-day, by means of which gambier is turned out in thousands of tons for shipment to Europe and America.

Before going into the question of manufacture, however, a few lines should be devoted to the growth and cultivation of gambier. The main points in gambier planting which are so attractive to Chinamen, are the great rapidity with which they get a crop out of the ground, and the small original outlay which is required. The history of the majority of these plantations will show that pepper has been planted out of gambier profits. Of course pepper is a great hit when all goes well, but it wants a considerable capital to start with, and it takes some years before it gets into anything like full bearing. It is altogether a plant of slower growth and longer life than gambier as it is now cropped. The leaf of the young gambier plant is thick and fleshy, and yields a large quantity of extract ; but as the shrub ages the leaves become thinner and more fibrous in texture and lose their characteristic fleshiness. In a little over ten years a plantation is almost valueless, and as a general rule is abandoned within fifteen years. This result is certainly due to the savage treatment to which the shrub is subjected. The Chinaman commences cropping his gambier about eighteen months after he has put it into the ground, after which he will go on cropping it two, three, or even four times a year, being guided more by financial

*From the *Straits Times*. Reprinted from the *Phar. Journ. and Trans.*, April 14, 1888, p. 369.

considerations or market rates than by the fitness of his plantation for the cropping. The shrubs are cut down with no sparing hand ; leaves, shoots, and twigs are all lopped off by the Chinaman's knife, and the plant is well nigh reduced to the condition of a mop-stick and left with barely sufficient leafage to enable it to carry on its existence. No attempt is made to manure the plantation. The soil, deprived of its natural shade, is left either to be burned into the consistency of a brick, or else the whole place is overrun with *alang*. The only wonder is that a gambier plantation is not used up sooner. It is quite an error to suppose that the plant exhausts the soil like indigo. With similar treatment gambier would last as long as pepper. The spent leaves from the gambier pans are said to be very good for pepper ; these leaves are quite exhausted by the time they leave the *bangsal*, and cannot possibly stimulate or nourish the vines, but they form a useful shade for the roots, and they are very serviceable in keeping off both white and red ants ; the bitter principle of the spent leaves repels these destructive insects which are otherwise attracted to the vines when they blossom.

The manufacture of gambier is as barbarous as its cultivation. The green leaves and shoots are roughly chopped with a *parang* and thrown into a *qualli*, which is then filled up with water ; the furnace below the iron pan is of the roughest possible construction, and consumes an immense quantity of firewood. While the leaves are boiling they are incessantly prodded with a sort of wooden trident in order to break them up and assist the process of maceration. When the amount of "gutta" which has exuded from the leaves causes the liquor to be thick and syrupy, the leaves are taken out and placed in a wooden trough which overhangs the pan at such an angle that the liquor drains freely back into the pan from the steaming mass in the trough. The liquor in the *qualli* is then ladled into small and shallow wooden tubs ; the leaves in the trough are once more swept into the pan and reboiled, after which they are taken out and thrown outside to be afterwards carried off to the pepper garden. The liquor left in the *qualli* from the second boiling is too weak to be converted into gambier, but is an excellent extract in which to boil up the next lot of green leaves.

As soon as the extract in the small wooden tubs already spoken of is sufficiently cool to allow of the hand being placed in it, a very curious process of agitation is adopted by the Chinese, which it is difficult to

clearly describe. The coolie squats before the tub, and plunges his half-closed hand into its semi-fluid contents, and in the hollow thus formed by his hand he incessantly works up and down a piece of light wood shaped like an elongated dicebox. The immediate effect of this treatment is to cause the gambier extract to thicken. In fact it sets up a process of crystallization; the extract assumes a concrete form and becomes *gambier*. When it is quite cool it is turned out from the tub as from a mould and cubed with a knife, which, as a rule, is made out of the iron hooping of a Manchester bale. The cubes are then put on coarse bamboo trays with wide meshes, the trays are placed in rudely constructed racks over the *dapur* and should be left there four or five days to get smoke-dried. The cubes at the end of this time will have thrown off an immense percentage of water, and have become greatly reduced in size. It is then packed in mats and sent off to one of the gambier houses fronting on Boat Quay, each of which possesses a capacious well of moderately dirty water.

It is easy to distinguish good gambier. If sound ripe leaves are boiled for a sufficient number of hours, and if the cubes are made not too large and are properly smoke-dried, then the gambier will be delivered into the godown in a hard compact mass weighing as near fifty catties as possible. There is some difficulty in stripping off the mat; the cubes are distinct and are of a good brownish-black color externally, and when broken will exhibit a deep mahogany red with an occasional streak of dark-yellow; there is a total absence of steaminess about such gambier, and when it has been put through the press, the pools of water near the bed plate and pump will not be covered next morning with a milky-white surface.

In the ordinary run of gambier which merchants are now content to receive, there are no traces of cubing, and when cubes are to be discerned they are of an extraordinary size, the color is of an unclean white to a dirty pale yellow, and the mass frequently steams. There is a farce gone through at the press of "rejecting" bad stuff, which is worse than useless, because it costs money, the "rejections" are all worked over again with mat scrapings, and are rushed through the godown with unfailing success. Any one who will take the trouble to walk along Boat Quay, between Elgin bridge and Coleman bridge, will see "rejections" being worked over by the ton; not a catty of this beastly stuff is lost by the Chinese. "Rejections," of which our shipments are now so largely composed, are simply nothing much more than

masses of putrescent boiled vegetable matter; it frequently shows large patches of a black or dirty blue color, it cannot hold together, but drops to pieces when handled, and often has a sour fetid smell. The fact is that the Chinamen, finding that anything will be accepted, boil down leaves which may be either too old or too young, mixed up with useless shoots and twigs; the *bangsal* proprietors save as much firewood as they possibly can, it being one of their principal items of expenditure; the extract is not sufficiently boiled and the crude stuff will not crystallize properly. It is doubtful whether it can stand a few days smoke-drying, but it is not put to this test, however, for after a very brief course of *asap*, it is bundled up in mats and delivered in all haste to the merchant, who accepts it with results which must be best known to himself.

A few words as to the general chemistry of gambier may be interesting. Roughly speaking, good gambier may be said to contain between 40 per cent. and 50 per cent. of tannic acid,¹ the other chief ingredient of gambier being a soluble gum: its action upon hides is to precipitate all their fatty and fleshy matter, leaving nothing but the imputrescible substance, that is to say, leather. Notwithstanding this precipitation, the hides take up so much gambier as to gain in weight by the process.

There is no space in this rapid sketch for any details about the working of the "hongkek," or of adulteration of gambier with foreign matter, but the overloading of gambier with water, combined with what can only be called the fraudulent method of its preparation, constitute adulteration of the worst and most destructive type.

REPORT ON ACETIC EXTRACT OF IPECACUANHA.¹

BY I. W. THOMSON AND WILLIAM DUNCAN.

The introduction of the new process for making ipecacuanha wine had, the authors said, been productive of a demand for a ready-made extract. The new process, although an advance on that of the 1867 Pharmacopoeia, was so troublesome that many preferred to buy the acetic extract rather than make it. They had published a process in *The Chemist and Druggist*, June 12, 1886, in which they recom-

¹? Catechin.—Ed. *Pharm. Journ.*

¹Abstract of a paper read before the North British Branch of the Pharmaceutical Society; reprinted from *The Chemist and Druggist*, March 31, 1888, p. 420.

mended the root to be macerated in the acetic acid for twenty-four hours, then transferred to a water-bath and the free acetic acid driven off, the acetified root then to be macerated in the sherry. They claimed that this process gives little trouble. The minimum of heating is required, and the product is in every way equal to that prepared by the pharmacopœial method.

Since the publication of their process they had examined several samples of the acetic extract as found in the market. From published statements it appears that ipecacuanha yields on an average 18 to 22 per cent. of acetic extract, while the root yields 1.6 to 1.7 per cent. of emetine. The acetic extract should, therefore, contain from 8 to 8.5 per cent. of emetine, taking the average yield of extract to be 20 per cent. Nine samples had been examined; seven were in powder and two lumpy. Three had been standardized, two with a silicate, apparently kaolin, and one with what appeared to be finely powdered exhausted root. No sample was entirely soluble in water, proof or rectified spirit; all were slightly acid. The yield of ash varied from 10 to 39 per cent., 10 per cent. being the natural yield. When volumetrically estimated by Mayer's reagent they gave the following results:—A=4.72, B=5.19, C=6.1, D=7.0, E=6.2, F=7.1, G=8.0, H=5.18, I=5.7 per cent. of emetine.

It therefore appeared that, however variable the 1867 wine might be in alkaloidal value, the 1886 preparation quite rivals it when made from commercial acetic extracts. That it is possible to make an extract containing the full amount of alkaloid was shown by the fact that one of the samples examined contained within .5 per cent. of the maximum that could be obtained. To remedy this discrepancy the authors recommended that the acetic extract should be standardized to contain at least 6 per cent. of alkaloid, or that their process of digesting the acetified root be tried, as it practically yields the same result.

Antipyrin Hæmostatic.—The experience of Dr. W. M. Powell, of Albany, Texas, in two cases, confirms the conclusions of Dr. Cosati as follows: "Antipyrin is a powerful hæmostatic; superior to iron perchloride, because it leaves the wound perfectly clean, and even superior to ergotin, because it is not toxic in ordinary doses; it is antiseptic as well as antipyretic, and its action is very prompt." A four-per-cent. solution is about the best strength to apply to bleeding surfaces.—*Virg. Med. Monthly*, April, 1888.

ON GUARANA.

BY DR. H. H. RUSBY.

From a lecture at the Philadelphia College of Pharmacy, December 1, 1887,
stenographically reported by Dr. C. H. Morgan.

The home of the Guarana is a very different region from that of the coca, although it forms part of the same great region. The great forest plains of Brazil, if they were grass-covered would present an appearance very similar to that of our own prairies, except that over the greater portion the surface of the country is so level that there is little to separate the rivers. During part of the year very little travelling occurs in this country. The rivers, which unite to form the Madeira, in this section at certain seasons of the year all unite to form one vast lake and a greater part of the country is under water. It is no uncommon occurrence to see the water flowing up streams as the level of a stream is raised higher than that of the other which ordinarily flows into it, by means of additions higher up. The smaller streams have an almost imperceptible current. They are extremely deep and narrow. I have parted the brush from the mouth of a stream which was narrow, but which had a depth of fifteen or twenty feet. The banks of this stream would be so covered with vines that you could hardly land. You could hardly penetrate for a single foot. Progress is prevented by the rushes, the driftwood and the brush. After this region is passed there is a belt of peculiar trees called Ambaibas, about the size of our ordinary forests of maple, poplar, and small oaks, yet it is noticeable only as a fringe to the neighboring frowning forest which towers up behind it. Vines fall down over the trees of smaller growth, covering them like a mantle, and in many places falling into the water. Back of that occurs the cane brake of various species of bamboo three miles in width, and then you reach the forest proper. Here there are no such obstacles as you find in the mountains. The travel is not so difficult. There will be long stretches where we can thread our way with success, then we come again to the jungle where the tangle commences. Once there we have to force our way; cutting our way is not practicable, for every time you cut something else falls in your way. There is nothing to do but to place your shoulders against the mass and simply push your way through. Among this cane brake run several species of deer, and a great number of tapirs, and it is the home of the prowling jaguar, which lies in wait for other animals, as does the alligator. Here, too, we are liable to encounter enormous anacondas.

Once you get to an instalment of the forest proper, instead of having bright butterflies and singing birds, you reach a region which is more like a region of death. The surface of the earth is covered, it is true, with vegetable growth, but it is at the summit of the trees one hundred and fifty feet above us. If you could look on the surface of this forest it would be a mass of green, but you are below and it is like a subterranean region with only a dark twilight, and it is all silent like the grave. There is a damp earthy smell to the air, which is never penetrated with the rays of the sun. The trees are often as thick as in our own forests. We can only imagine what scientific treasures we could secure were this upper region accessible to us. After all, the region is richer in vegetable growth than the mountain region, but it is so far above us we can't see it.

Such is the home of the Guarana. This is one of the smallest vines which border the water courses above described. Unlike coca, its origin is easily apprehended. The Sapindaceæ family is largely represented in Brazil, especially by three genera of climbing vines. I have no specimens of this with me. It is found wild in many parts of this region. The stem appears like three cylindrical pieces amalgamated into a triangular stem. Its branches are long and slender, climbing by their tendrils.

With the wild plant we have nothing to do. The collection of the drug from the wild plant in this region presents insuperable difficulty. The plant has long been cultivated in the region of the lower Madeira. Guarana is cultivated in this district about here (indicating), it is also a little further south and perhaps a little east. Here it presents a very different aspect from what it does in the wild state. It is planted out just as a vineyard is planted, except that it is planted wider apart and trained to poles the same as hops. The plant is kept within bounds by pruning. The ripening of the seeds is shown by the opening of the pods. Immediately upon this the fruit is gathered to prevent the inevitable loss which would occur from its falling. This fruit resembles the hickory nut. It is contained in a husk, which husk consists of three instead of four parts. From these the seeds are shelled out by hand as hickory nuts are. First they are washed free from a phlegmy substance and then subjected to a roasting process of six hours' duration, which loosens from them a papery shell which is removed by placing them in sacks, and beating them with clubs. The best varieties of Guarana are those in which the seeds have not been very finely broken. A small amount of water is then added, just sufficient to form a mass. It is kneaded by hand into a mass of the consistency of dough. I have been informed that the common belief in this country is that other materials are added to this mass by which it is adulterated. The fact is that other things are not generally so added. A large building is then utilized for the drying purpose. Upon the upper floors of this building this material is spread out and subjected to a slow fire of fuel, selected with a view of making no smoke, the object being to keep the temperature equable, maintaining at the same time sufficient heat. It is exposed in this way for a certain number of weeks when it is ready for the market. Great experience is necessary to carry on this process. This is the manner in which it is prepared in its own home. It is used there by the natives, a portion being grated off with a large file, and it is served in a glass full of cold water. Its effects are very refreshing, but its excessive use is deleterious. It contains two or three times the quantity of caffeine that coffee does, producing a happy effect on the nervous system, but if used in excess bringing on trembling and a palsied condition of the limbs.

Icthyol in Rheumatism.—Doubelir reports that in the military hospitals of Moscow ichtyol has been given in eight cases of articular rheumatism, six of which were acute and two were chronic. The result was diminished pain, but continued swelling. The remedy may be given in pills or capsules containing one and a half to three grains each. Of these from six to twelve of the first and from three to six of the second may be given in twenty-four hours.—*L'Union Méd.; Méd. News*, Dec. 10th, 1887.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, April 17, 1888.

The meeting was called to order and Mr. A. Robbins was asked to preside. The minutes of the last meeting were read and approved. A paper upon *pyroxylin* by G. M. Beringer, Ph. G., was read and referred to the Committee on Publication. Samples of the nitrated wood pulp were exhibited both in an amorphous state and rolled in sheets under only moderate pressure. The process for obtaining wood pulp was enquired into; and in reply it was stated that in some cases, billets of wood were placed in a close cylinder and super-heated steam passed over them till the wood was completely disintegrated, when it is then treated with caustic soda solution. Other makers make the wood into shreds like wood packing and some into shavings; all of these forms after the treatment with alkaline solutions are thoroughly washed and pressed; this yields the wood pulp of the paper maker.

Professor Remington called attention to a long iron cylinder which was on the table and which he explained as one of the containers of *liquid carbonic acid*, now supplied by a company termed the American Carbonate Company. Their process is to prepare the gas by treating only pure carbonate of lime washing the gas and compressing it into a liquid condition in the cylinders such as exhibited. Its uses are so manifold that it would seem to be a most valuable application of science to the arts in many directions, as for preparing carbonic acid water, for bags for divers to raise heavy weights in water, to float sinking vessels, and for many other purposes. As mixtures of air with twenty per cent. of carbonic acid will not support combustion, carbonic acid is quite valuable as a fire extinguisher, and may be conducted by means of pipes with outlets in various parts of a building. Enquiry was made as to the composition of the solution used in *hand grenades* and it was said they were largely carbonated solutions of various salts. Ammonia is also quite effectual in extinguishing fires as was shown in the case of a fire occurring in the cellar of a drug house when the heat burst two carboys of ammonia water which extinguished the fire. The preservation of fresh meats has also been effected by means of carbonic acid gas for several weeks at a time. The many uses to which the gas in this portable shape can be applied render it probable that quite a revolution in some industries may take place.

The question of the strength of *nitric acid* needful in preparing pyroxylin led to some discussion as to the reason that the manufacturing chemists did not make an acid of 43° B. for the trade. Professor Remington stated that it was for prudential reasons entirely; that it was unsafe to transport an acid over 38° in the usual package, and that it had been found that the usual materials employed for packing would lead to inflammations if brought into contact with acid stronger than 38°.

The query was made whether *methylic alcohol* could be used as a fuel for lamps without suffering from the very unpleasant odor that belongs to it in its usual form; the reply was that it had been found unsuited.

An enquiry was made whether an apothecary was liable to the United States Government liquor tax if he sold spirituous liquors on physicians' prescrip-

tions; the answer was that if sold at all a license must issue first, as there is no authority given to any one to set aside that law.

On motion adjourned.

T. S. WIEGAND,
Registrar.

EDITORIAL DEPARTMENT.

The Seventh International Pharmaceutical Congress.—At the sixth International Pharmaceutical Congress held in Brussels in 1885, the city of Milan was selected for holding the Seventh Congress in 1888 (see *Am. Jour. Phar.* 1885, p. 528). During the past month we have learned from European journals, that recently the *Associazione Farmaceutica Lombarda* have inaugurated the preliminary steps for holding the Congress during the month of September next. The various pharmaceutical and kindred associations of Italy have been addressed with the view of securing their active cooperation, and it is confidently expected that within the comparatively limited time remaining the arrangements for a successful meeting will be completed.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

The Beginnings in Pharmacy.—An introductory treatise on the practical manipulation of drugs and the various processes employed in the preparation of medicines, in eight chapters, with numerous formulas. By R. Rother, graduate of the University of Michigan, etc., Detroit. William Graham Printing Co. 1888. 8vo. Pp. 342. Price, \$1.75.

In 1853, a committee appointed by the American Pharmaceutical Association, addressed a series of questions to leading apothecaries in different parts of the United States, of which the third ran thus: "Is any personal instruction extended to apprentices beyond the practical details of the shop, as regards chemistry, materia medica, and botany?" The answers received were summarized, we think by the later Professor Procter, and published in the Proceedings for 1854, pp. 31 and 32. Every one of these answers states either that no personal instruction, or very little personal scientific instruction is given to apprentices; and it is further stated or intimated that but few are qualified to give it. This non-qualification for giving instructions does not necessarily infer ignorance; for a person may possess a good and sound knowledge, without being able to impart it to others, or, in other words, without having the faculty of *teaching*; moreover the demands of business upon the time and energy of the employer are frequently such as to render it impossible for him to give attention to it. To such the book before us will be a most welcome one, as it will enable the employer to lead his apprentices to proper methods for acquiring knowledge; and apprentices will value it for the same reason, the more so as by using it properly

they will be led to habits of observation and care. The book teaches the *handling* of the drugs and implements; that is to say, in using the book these articles are to be taken up and, with the aid of the book, examined in various directions, such as the place where it is kept, the container used, the striking properties of the article, the proper way of weighing and wrapping it, its origin, uses, etc., etc., which form the scope of the plain and practical lessons.

The book is divided into eight chapters, each with a suitable number of subdivisions. These chapters are headed, "The handling" of solids; of liquids; of mixed solids and liquids; of heated solids and liquids; of gases and vapors; of incompatible solids, liquids, and gases; and of weights and measures; the eighth chapter being entitled, "The right use of technical terms." The work is practical, useful, and correct, well adapted for the tyro, and admirably fitted for a guide in "the beginnings in pharmacy."

Skeleton Notes Upon Inorganic Chemistry. Part I. Non-metallic elements. By P. de P. Ricketts, Ph. D., Professor of Assaying in the School of Mines, Columbia College, N. Y. City, and S. H. Russell, E. M. New York: John Wiley & Sons, 1887. Price, \$1.50.

These skeleton notes are intended to aid the beginner in following lectures on chemistry, and, therefore, present the merest outline, arranged in such a manner and copiously interleaved, so that the student may supply additional matter in his own way. The non-metallic elements are arranged alphabetically. The shape and size of the book render it convenient for a note book.

Toilet Medicine: a popular scientific manual on the correction of bodily defects, and the improvement and preservation of personal appearance; together with formulæ for all the preparations recommended. Second edition. By Edwin Wooten, B. Sc. etc. New York: J. H. Vail & Co., 1888. 12 mo., pp. 114. Price in cloth, \$1.00.

As explained in the title, this is not a work on toilet articles, but is intended to assist in the removal of certain bodily imperfections which do not require the services of a surgeon. Some such "imperfections" are imaginary, as for instance the gray color assumed by the hair with advancing years; but others like bruises, burns, corns, frost bites, etc., are fairly entitled to treatment with toilet medicines. After some general remarks on the treatment of the person in health, the different affections with their remedies are considered and arranged according to the different organs and parts of the body, followed by a chapter on dress and eating and drinking. In all cases the causes of the affections are explained, and formulas are given for mostly simple external applications, which appear to have been judiciously selected, rendering the little work practical and useful. In some cases the directions, particularly for laymen, should be more explicit; thus page 86, it is recommended in cases of poisoning to send for the doctor, meanwhile for *strong acids* to give, among other things, *ammonia*. The daily use of *atropine* as a wash, without the supervision of a physician, is a dangerous practice, even though the solution contain only one grain to the pint (p. 44).

Handbuch der praktischen Pharmacie für Apotheker, Drogisten, Aerzte und Medicinal-Beamte. Bearbeitet von Prof. Dr. H. Beckurts und Dr. B. Hirsch. Stuttgart: Ferdinand Enke, 1887. 6 und 7 Lieferung, pp. 481—733.

Handbook of practical pharmacy, for apothecaries, druggists, physicians and medical officers.

The two fascicles before us complete the first volume of this work, which we have extendedly noticed in the July and October numbers, last year, where its scope and arrangement were explained, and its usefulness and value commented upon. The medicinal and other preparations, following in alphabetical order of their Latin titles, have reached extractum valerianæ with which the volume closes.

The Pennsylvania State College Agricultural Experiment Station. Bulletins Nos. 1 and 2.

The Agricultural Experiment Station of the Pennsylvania State College, at State College, Centre Co., was established by vote of the trustees, June 30th, 1887, in accordance with the provisions of the act of Congress, known as the Hatch act, approved March 3d, 1887, thereby greatly enlarging the experimental work carried on at the College since its foundation. The bulletins contain a historical sketch of the agricultural experiments conducted at the College during the thirty years commencing with 1857; and reports upon the composition and development of soiling crops, and upon field experiments with phosphates.

Duality of the Brain, a theory of mind-reading and slate-writing. By R. E. Wood, M. D., Professor of Physiology and Hygiene in the Southern Medical College, Atlanta, Ga.

A very interesting essay, the drift of which is indicated by its title, and which will be read with profit also by others than medical men.

The Lomb Prize Essays.—In the July number of last year (page 381) we noticed the publication of four essays relating to subjects of hygiene, and published under the above general title by the American Public Health Association, by whom they are sold at a mere nominal price with the view of giving them the widest possible circulation. For the current year Mr. Henry Lomb offers through the same association two prizes of \$500 and \$200, for the two best essays on "practical sanitary and economic cooking adapted to persons of moderate and small means." The awards will be announced at the next meeting of the American Public Health Association by the following judges: Prof. Charles A. Lindsley, New Haven, Conn., Prof. George H. Rohé, Baltimore, Md., Prof. Victor C. Vaughan, Ann Arbor, Mich., Mrs. B. H. Richards, Boston, Mass., Miss Emma C. G. Polson, New Haven, Conn.

The arrangement of the essay will be left to the discretion of the author. They are, however, expected to cover, in the broadest and most specific manner, methods of cooking as well as carefully prepared receipts, for three classes—(1) those of moderate means; (2) those of small means; (3) those who may be called poor. For each one of these classes, receipts for three meals a day for several days in succession should be given, each meal to meet the requirements of the body, and to vary as much as possible from day to day. Formulas for at least twelve dinners, to be carried to the place of work, and mostly eaten cold, are to be given. Healthfulness, practical arrangement, low

cost, and palatableness should be combined considerations. The object of this work is for the information of the housewife, to whose requirements the average cook-book is ill adapted, as well as to bring to her attention healthful and economic methods and receipts.

All essays written for the above prizes must be in the hands of the Secretary, Dr. Irving A. Watson, Concord, N. H., on or before Sept. 15, 1888. Each essay must bear a motto, and have accompanying it a securely sealed envelope containing the author's name and address, with the same motto upon the outside of the envelope.

After the prize essays have been determined upon, the envelopes bearing the mottos corresponding to the prize essays will be opened, and the awards made to the persons whose names are found within them. The remaining envelopes, unless the corresponding essays are reclaimed by authors or their representatives within thirty days after publication of the awards, will be destroyed, unopened, by the Secretary.

It is intended that the above essays shall be essentially American in their character and application, and this will be considered by the judges as an especial merit.

Competition is open to authors of any nationality, but all the papers must be in the English language.

OBITUARY.

Jules Emile Planchon died early in April, at Montpellier, where for many years he held the chair of botany and pharmacognosy (natural history of medicaments) in the medical school and in the école de pharmacy of that city; he was also director of the botanical garden connected with these institutions.

Daniel C. Robbins died suddenly of heart disease, in Brooklyn, April 15th, aged 73 years. He was a member of the firm of McKesson & Robbins, in New York, and for many years prepared annually, for the Chamber of Commerce for that State, the Review of the Drug Trade of New York, the last one published being for the year 1886.

Joseph T. Brown died in Boston, April 23rd, aged 78 years. He was the last survivor of four brothers, all apothecaries, who carried on business on Washington street, Boston, for a longer or shorter period during the last sixty years.

William N. K. Boileau, Ph. G., Class 1876, died in Philadelphia, March 4th. He was born at Eddington, Bucks county, Pennsylvania, and at the time of his death was a student at the *Medico-chirurgical* College expecting to graduate this spring.

John Wm. Hugo Oppermann, Ph. G., Class 1874, died of bloodpoisoning, April 19th, aged 37 years; for a number of years he had been in business at 8th and Oxford streets.

Kinsey Durell, a senior student of the Philadelphia College of Pharmacy, died at his father's residence in Chester, March 2.

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Vol. 60

AMERICAN

No. 6

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Under the supervision of the Publishing Committee, consisting of

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Vol. XVIII., No. 6

CONTENTS.

Notes on Some New Remedies. By John M. Maisch 273
Laboratory Notes. Abstracts from Theses. 277
Analysis of Cassia Nictitans, Linne 280
Elixir of Theine Hydrobromate. By Joseph W. England, Ph. G. 280
Should Formulæ for the Popular Elixirs be incorporated in the Pharmacopœia? By George M. Berlinger, Ph. G. 283
Abstracts from the French Journals 286
Methods for definitely proving the Presence of Cotton Oil or of Oil of Sesame in Olive Oil. By M. Milliau 290
The Action of finely divided Metals on Solutions of Ferric Salts. By Douglas J. Carnegie, B. A. 291
Vapor-Density of Ferric Chloride at various

Temperatures. By W. Grunewald and V. Meyer 296
Ancient Materials for Paper Making 298
Notes on Ipecacuanha Wine. By C. A. MacPherson 299
Ghatti, and other Indian Substitutes for Gum Arabic. By A. Mander 301
Asarone, By B. Rizza and A. Butlerow 304
Terpenes and their Derivatives. By J. W. Brühl 307
Cinchona Cultivation in Bolivia. By Dr. H. H. Rusby 310
Pharmacopœia of the Philadelphia Hospital 313
Minutes of the Pharmaceutical Meeting . 318
Editorial 319
Obituary 320

NOTICE TO READERS.

This journal is devoted to the advancement of PHARMACEUTICAL KNOWLEDGE and to the advocacy of a MORE THOROUGH EDUCATION and PRACTICAL TRAINING for all persons engaged in PREPARING and DISPENSING medicines, drugs and chemicals.

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Address all papers for publication, etc., to the Editor JOHN M. MAISCH.

All communications relating to subscriptions, advertisements, etc., to the Business Editor, H. H. WOLLE, 143 North Tenth Street, Philadelphia, Pa.

Meetings of State Pharmaceutical Associations.

STATE	TIME	PLACE	LOCAL SECRETARY.
Indiana.....	June 6th.....	Fort Wayne.....	J. R. Perry, Indianapolis.
Massachusetts.....	June 5th.....	Roston.....	
Minnesota.....	June 12th.....	Stillwater.....	J. C. Hearing.
Missouri.....	June 19th.....	Sweet Springs.....	J. D. Eads, Warrensburg
New York.....	June 19th.....	Catskill.....	G. A. Dykeman
Ohio.....	June 12th.....	Columbus.....	H. C. Cook.
Pennsylvania.....	June 12th.....	Titusville.....	C. D. Lippincott.
Texas.....	June 12th.....	Austin.....	E. D. Oesch, Fort Worth.
West Virginia.....	June 19th.....	Clarksburg.....	C. Meakemeller, Wheeling.

NOTICE TO PENNSYLVANIA PHARMACISTS.

All Pennsylvania Pharmacists entitled to Certificates of Registration have now received them, and they are hereby notified that to constitute "good and sufficient evidence of registration" said certificate must be kept conspicuously displayed in the place of business of the person registered.

The display of the Certificate being the only visible evidence to the public of proper registration, any person failing to comply with this provision will become liable to prosecution for carrying on the business without a Certificate.

The next examination will be held in July in the northern or western part of the State.

Applicants for examination should apply to the Secretary of the Board late in June for the exact date and place of the meeting.

By order of the State Pharmaceutical Examining Board,

H. B. COCHRAN, SECRETARY,

LANCASTER, PA., April 13th, 1888.

Pennsylvania Pharmaceutical Association.

The Eleventh Annual Meeting will be held in Titusville, TUESDAY, JUNE 12th 1888. The first session will begin at 7 P. M. The remaining sessions will occupy the two following days. Good hotel accommodations have been secured at reduced rates. Rail-road fare at excursion rates are also expected.

Both the place of meeting and the Exhibition Room will be in the new Armory Building, the latter occupying the first floor. Articles intended for the Exhibition should be sent to the Local Secretary, C. D. Lippincott, Titusville. Arrangements are in progress for making this occasion a very pleasant one to all who will attend the meeting.

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THE AMERICAN JOURNAL OF PHARMACY.

JUNE, 1888.

NOTES ON SOME NEW REMEDIES.

By JOHN M. MAISCH.

Chloralcyanhydrin or *Chloralhydrocyanide* was obtained in 1872 by Hagemann, and by Pinner and Bischoff, by treating chloral with anhydrous hydrocyanic acid at an elevated temperature. A ready method for preparing this compound was given by Pinner (*Berichte*, 1884 p. 1997) and consists in dissolving chloralhydrate in a 10 or 12 per cent. solution of hydrocyanic acid, obtained from potassium ferrocyanide equal in weight to that of the chloralhydrate; the solution is set aside for 24 hours, then for several hours digested using a reversed condenser and finally evaporated on the water bath. It crystallizes from water or carbon disulphide in thin white rhombic plates, melts at 61°C., boils with some decomposition between 215° and 220°, has an odor recalling that of hydrocyanic acid and chloral, and is readily soluble in water, alcohol and ether. Its composition is represented by the formulas $C_2H_2Cl_2NO$ or $CCl_3 \cdot CH(OH) \cdot CN$, and it is the nitrile of trichlorolactic acid, this acid being generated by strong hydrochloric acid. The solution in distilled water remains unchanged for some length of time, and does not produce a precipitate with silver nitrate, except after heating when $AgCy$ is deposited. Alkalies decompose the compound, yielding chloroform, hydrocyanic acid and formic acid. The compound has been recommended as a substitute for hydrocyanic acid, of which it yields 15.5 per cent.; or 6.452 parts of chloralcyanhydrin correspond to 1 part HCy . 1.29 gm. chloralcyanhydrin dissolved in 9 gm. distilled water furnishes a solution corresponding in strength to the officinal 2 per cent. hydrocyanic acid; and a solution of 0.645 gm. in 100 gm. of water corresponds in strength to a bitter almond water with $\frac{1}{16}$ per cent. HCy . (See also AMER. JOUR. PHAR., 1888, p. 13.)

Sulfonal is a new hypnotic, which has been experimented with by Professor A. Kast (*Berl. klin. Wochenschr.*, 1888, No. 16), and was found to produce on animals no untoward or deleterious effects even when given in large doses. Taken by healthy persons, sulfonal has no effect or merely produces a sensation of lassitude and fatigue, and but rarely induces sleep; but in patients suffering from wakefulness from various causes, sound and quiet sleep was produced in from thirty minutes to two hours, and lasting for from five to eight hours. The medium dose is from 2 to 3 gm., but even doses of 4 gm. given at short intervals alternating with medium doses have no ill effects.

Sulfonal is prepared by E. Baumann (*Berichte d. d. Chem. Ges.*, 1886, p. 2808) by oxidizing dithioethyl-dimethyl-methane with potassium permanganate in the presence of a little acetic or sulphuric acid. It crystallizes from boiling water in colorless thick prisms or plates, is inodorous and tasteless, sparingly soluble in cold alcohol, more freely soluble in ether, chloroform and benzol, and requires about 100 parts of cold water or about 18 parts of boiling water for solution. It melts between 130° and 131° C., and boils near 300°; the yellowish distillate again yields the pure compound on recrystallization. Its composition is diethylsulfone-dimethyl-methane = $(\text{CH}_3)_2\text{C}(\text{SO}_2\text{C}_2\text{H}_5)_2$. It is not decomposed by boiling with alkalis. Hot sulphuric acid gradually decomposes it. It dissolves in concentrated sulphuric or nitric acid, and is reprecipitated on the addition of water. Its solution in bromine, on evaporation, leaves the unaltered compound.

Mercuric alaninate has been prepared by Dr. R. DeLuca (*La Riforma Medica*) by dissolving one part of alanin in 20 parts of distilled water, heating to boiling, saturating with mercuric oxide, filtering, evaporating and crystallizing. The compound is in whitish microscopic needles grouped in crosses and tufts, and soluble in three parts of water, the solution being colorless and permanent on exposure to air and light. In dilute solutions it will not coagulate albumen; in concentrated solutions its coagulating power is limited to its causing a cloudiness of that part of the liquid with which it comes immediately in contact. In other respects it has the general properties of other salts of mercury. Preliminary experiments on animals showed that the compound was not very poisonous. On his patients Dr. DeLuca used it in solutions of 4, 8 and 10 milligrams to 1 cc. of distilled water, both for internal use and for injections, subcutaneous or inter-muscular. The daily quantity used on each adult patient was from 5

to 10 milligrams. The average number of days of treatment for each of the twenty patients was 37.02; average number of injections to each patient, 27.7; average age of patients, 23.2 years. All the cases were those of secondary syphilitic lesions.—*Med. Jour. and Exam.*, May, 1888, p. 305.

***α* OXYNAPHTHOIC ACID** has been recommended as a valuable disinfectant. Eller, who first prepared this compound twenty years ago, named it carbonaphtholic acid. Subsequently L. Schäffer, (*Annalen* 1869, vol. 152, p. 291), distinguished the *α* and *β* acids, of which the former is colored blue, but the latter purplish-black by ferric chloride. R. Schmitt, in 1884 (*Berichte*, 1885, Ref., p. 204) had a process patented for the manufacture of carbonaphtholic or oxynaphtoic acids, which consisted in treating sodium naphthol with carbonic acid under pressure and heating to between 120° and 140° C. Of the various compounds which may thus be obtained, the *α* acid is now prepared on a large scale and has been ascertained to possess valuable disinfectant properties. It crystallizes in colorless needles, has an odor recalling that of naphthol, is sternutatory, and when carefully heated sublimes without decomposition. It is soluble in alcohol and ether, but requires about 30,000 parts of water for solution. This solution of the pure acid remains unaltered on exposure, but that of the crude acid turns yellow and red. On boiling decomposition takes place with the production of carbonic acid and naphthol. The crude acid leaves about 0.4 per cent. of ash. Its antizymotic properties are considerably greater than those of salicylic acid. It has been found, when added to the substances named, to prevent the decomposition of blood, urine, mucilage, paste and similar articles, and to render sinks and water closets inodorous. Owing to its poisonous properties it is not adapted for the preservation of articles of food, but as a surgical antiseptic it appears to be useful, and an *oxynaphtoic collodium* has been recommended containing one-half per cent. of this compound.

Creolin is a product of the dry distillation of coal and forms a blackish brown, almost syrupy and viscous liquid, having a tar-like odor and when dropped in water, forming delicate white clouds, a single drop rendering from 250 to 300 cc. water uniformly milky and opaque. It has been employed by Dr. J. Neudoerfer (*Phar. Post*, 1888, p. 24) as an antiseptic for wounds and in several cases of erysipelas, and was usually applied by means of gauze, previously freed from fat, in the form of solution of two drops to 200 cc. water.

An examination of creolin by A. Gawalowski (*ibid.* p. 229) elicited the following: It is thickish, clear, of a dark granate red to chestnut brown color; has a vinous aromatic taste with a pungent soapy and burning after-taste, and a tarry odor; reaction neutral; spec. grav. at 17.5° C. 1.066; soluble in all proportions of absolute alcohol, also in 95 per cent. alcohol, chloroform, and in ether and acetic ether; soluble clear in 1.7 parts of 70 per cent. alcohol with more becoming turbid; partly soluble in petroleum benzin, leaving a tarry black brown residue; insoluble in wood spirit, becoming flocculent, then oily; with carbon disulphide forms a light brown emulsion and separates a tarry layer, becoming whitish-yellow and oily; with water forms a milky greenish-yellow liquid; with acidulated water yields a brownish emulsion separating a supernatant fatty layer; with alkaline water gives a dingy yellow permanent emulsion, and with glycerin likewise an emulsion separating an oily layer.

Subjected to heat creolin yielded a distillate at 100° C. amounting to 45.0 per cent.; between 100° and 147° C. 26.33 per cent. and left tarry residue 22.90 per cent. and ash 5.77 per cent. The saponifiable fat acids and resins amount to 0.30 per cent.; resin readily soluble in alcohol (possibly guaiac) 0.78 per cent.; tar bases 0.48 per cent.; tar compounds combining with alkali 61.88 per cent. The ash contains sodium with traces of potassium. The portion soluble in benzin was 72.8 per cent., and had an aromatic naphthalin-like odor. Naphthalin, fluorescein, aniline, toluidin, phenol and picric acid were determined qualitatively. According to this analysis creolin consists mainly of coal tar, with the addition of some resin soap, fat soap and caustic soda.

For the internal administration of creolin the form of mixture does not appear to be adapted; for on diffusing 0.05 gm. of it in 25 gm. of water, and adding 5 drops of this emulsion to 60 gm. of syrup of marshmallow, the syrupy mixture still had a very persistent tarry and soapy taste.

Naphthol water for purulent discharges from the nostrils, is prepared by Dr. Ruault (*Arch. Laryngol*) by dissolving β naphthol 125 gm., in alcohol 88 gm., and mixing a teaspoonful of this solution with a liter of lukewarm water. The unpleasant sensation produced by the use of this liquid disappears in a short time. For intolerant patients a weaker mixture may be used, or a preliminary spray of cocaine may be employed.

LABORATORY NOTES.

Abstracts from Theses.

Commercial sugar whitened by blue pigment appears to be more frequently met with at the present time than formerly. During the spring and summer of 1887, Charles C. Stratton, Ph. G., procured at different times 17 samples of sugar, all of which were labeled "first grade granulated," the majority of the samples being the products of one refinery. Every one of these sugars was whitened with a blue pigment, the nature of which was not examined except in a few instances, when it proved to be ultramarine. For determining the amount of blue pigment, six pounds of sugar were used of each lot, except a few specially noted below. The sugar was dissolved in pure water; the syrup was set aside for 3 or 4 weeks, and then decanted from the sediment; the residue was diluted with water, mixed with alcohol, and this mixture allowed to settle, decanted and filtered, the undissolved portion being washed upon the filter, dried and weighed. The yield of blue pigment was as follows: 1., 2 grains; 2., 8 grains; 3., 10 grains; 4., 6 grains (mostly dirt; little blue); 5., 6 grains; 6., 5 grains (about one half dirt); 7., (from 25 oz.) $1\frac{1}{2}$ gr.; 8., 6 gr.; 9., (from 25 oz.) $\frac{3}{4}$ gr.; 10., 3 gr.; 11., 4 gr.; 12., $12\frac{1}{2}$ gr., of which about 4 gr. was blue pigment; 13., $5\frac{1}{2}$ gr. blue and 5 gr. dirt; 14., very little blue; 15., $12\frac{1}{2}$ gr. nearly pure blue; largest amount observed; 16., $3\frac{1}{2}$ gr., and 17., 3 gr. blue and 2 gr. dirt. Since most of the samples came from one factory, it will be seen that the coloring matter used for different lots of sugar by the same maker varies in amount, but is in all cases small and probably not injurious, though it should be considered as an adulterant.

Reference is also made by the author to a paper published in a western journal, stating that the sugars of five refineries in New York and Philadelphia, were found to be whitened with ultramarine in three cases, and with Prussian blue in two cases, while the sugar of a Brooklyn refinery had been found free from foreign coloring matter.

Assay of chocolates.—Howard M. Smith, Ph. G., examined five samples of commercial chocolate by the following process: The chocolate, using 5 gm. of each sample, was exhausted by maceration with petroleum spirit, and the liquid filtered off and evaporated spontaneously. The residue after driving off the petroleum with heat, was mixed with an equal weight of magnesium oxide, macerated for two days with 50 cc. of 80 per cent. alcohol, the mixture heated to boiling, and the liquid filtered into a tared beaker and evaporated to dry-

ness by means of a water bath. The extract was deprived of oil by petroleum spirit, and of theobromine by ether, leaving sugar behind. The exhausted chocolate was now treated with 100 cc. of water at 15° C., the filtrate evaporated, the extract redissolved in 10 cc. of water, the gum precipitated by the addition of alcohol, and an additional quantity of sugar was obtained by evaporating the filtrate. The following table gives the percentage of the ingredients :

	Oil.	Theobromine.	Gum.	Sugar.	Undissolved residue.
I.	23.52	1.3	1.64	40.74	32.8
II.	22.26	.92	1.50	28.06	47.26
III.	42.4	1.74	.34	2.36	53.16
IV.	28.48	1.52	.78	3.86	65.36
V.	31.84	1.26	.66	5.02	61.22

Nos. IV. and V. were readily suspended on being stirred in hot water or milk ; and all the samples were easily diffused in these liquids by boiling for five minutes.

Comparative value of commercial gingers.—Several commercial varieties of ginger were procured by Frank M. Siggins, Ph.G., and assayed for the amount of resinous extract ; 8 ounces of each sample in No. 60 powder, were exhausted by percolation with alcohol of .820 spec. grav., the percolate was distilled until about one fluidounce remained, which was evaporated in a tared capsule by means of a water bath, until it ceased to lose weight ; the results were as follows :

I. Jamaica, unbleached.....	5.0 per cent. resin.
II. Jamaica, bleached.....	4.8 " " "
III. East India.....	6.65 " " "
IV. East India.....	6.57 " " "
V. African.....	6.17 " " "
VI. African.....	7.0 " " "

These results agree with those of former investigators, showing that African and India gingers yield more resin than does Jamaica ginger, and would seem to be preferable to the latter for medicinal use. The unbleached Jamaica ginger was also treated with petroleum benzin, but this menstruum yielded only 2.62 per cent. of resinous extract.

Sodium and ammonium hydrates were tried to ascertain whether they could be used to form a good extract soluble in water ; but the results were not satisfactory. By percolating the tincture of the drug through animal charcoal it may be made nearly colorless, and still retains the sharp, pungent and characteristic taste.

Potassii iodidum.—Geo. A. Curriden, Ph. G., prepared some potassium iodide in the usual manner, by treating potassium hydrate with resublimed iodine, igniting the salt with charcoal, and crystallizing twice. To this sample, marked No. 1, the pharmacopœial tests for purity were applied, and four commercial samples, procured from manufacturers in New York, Philadelphia, St. Louis and Baltimore were examined in the same manner, giving the following results :

PHARMACOPŒIAL TESTS.	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
For alkali with litmus paper.	Faint blue.	Deep blue.	Violet blue.	Violet blue.	Deep blue.
For iodate.	Clear, then yellowish.	Brownish.	Purplish blue immediately.	Purplish blue immediately.	Brownish.
For chloride or bromide.	Clear.	Cloudy at once.	Cloudy and precipitate.	Cloudy and precipitate.	Cloudy at once.
For sulphate.	Clear.	Cloudy at once.	Clear.	Clear.	Cloudy at once.
Weight of AgI.	1.415.	1.388.	1.415.	1.300.	1.400.

The precipitated silver iodide was well washed, carefully dried, brought to the fusing point in a porcelain crucible, cooled and weighed. Of the commercial samples, No. 3 alone yielded the theoretical weight. The weight of iodide procured by the remaining three commercial samples being *less*, the difference was probably due to the presence of carbonate, sulphate and iodate, the amount of which impurities was not estimated.

Hydrargyrum ammoniatum.—This compound was prepared by Wm. J. Williams, Ph.G., according to the pharmacopœial process, and corresponded with all the requirements of the pharmacopœia. This specimen was marked No. 1. Three commercial specimens were purchased, of which No. 2 alone was fusible. The pharmacopœial tests being applied to all, the following results were obtained :

Pharmacopœial tests.	No. 1.	No. 2.	No. 3.	No. 4.
Heated to redness,	Completely volatile.	2 per cent. residue, mostly Fe_2O_3 .	$2\frac{1}{2}$ per cent. residue, mostly Fe_2O_3 .	Completely volatile.
Solubility in HCl,	Soluble; no effervescence.	Soluble; no effervescence.	Soluble; no effervescence.	Soluble; slight effervescence.
Lead (solution in acetic acid tested with H_2SO_4),	Absent.	Absent.	Absent.	Absent.

ANALYSIS OF CASSIA NICTITANS, LINNÉ.

BY CHARLES S. GALLAHER, PH. G.

From an Inaugural Essay.

This plant is known as wild sensitive plant, and grows abundantly in the neighborhood of Philadelphia where it was collected for analysis, then dried and reduced to powder No. 80. The air-dry powder on being heated to between 100° and 110° C., lost 3.7 per cent. of moisture, and yielded 4.8 per cent. of ash.

Petroleum benzin extracted a minute quantity of volatile oil, and 0.08 per cent. of waxy matter melting at 58° C. Ether took up from the powder 5.6 per cent. of resinous matter and chlorophyll, tests for glucosides and alkaloids giving negative results. The alcoholic extract on being treated with water, left 5.78 per cent. of resinous matter undissolved; the aqueous solution yielded nothing to petroleum spirit, benzol and chloroform; tested with gelatin and ferric salt, the presence of tannin was revealed and this was estimated by precipitation with copper acetate and ignition, the result being 7.44 per cent. of tannin. The aqueous extract weighed 17.28 per cent.; this was found to be free from glucose, but contained another sugar, dextrin, and gum; cathartic acid could not be prepared from it, but the powder was ascertained to have a laxative effect and to produce griping. Tests applied for starch gave negative results; albumin, pararabin, calcium oxalate, lignin and cellulose were present.

A larger quantity of the fresh plant was distilled with water in the presence of lime, but no volatile alkaloid was obtained. Another portion distilled with dilute sulphuric acid yielded a distillate having merely a faint acid reaction.

ELIXIR OF THEINE HYDROBROMATE.

BY JOSEPH W. ENGLAND, PH.G.

Read at the Pharmaceutical Meeting, May 15.

As a remedy in the treatment of certain nervous affections, the alkaloid theine or caffeine, seems to be rapidly growing in medical favor and use.

Although as early as 1838, Mulder and Jobst found that theine and caffeine were chemically identical, it is yet a mooted question, but the burden of evidence seems greatest in favor of that assumption.

Meanwhile, manufacturers frankly say that they make both their theine and caffeine from tea leaves, and if theine is called for they give theine, or if caffeine is desired, they give the same, so that it is safe to assert that many of the statements made concerning the superiority of one of the alkaloids over the other, are open to serious question, unless the true source of the alkaloid used is known.

Hypodermically, theine has been highly lauded in the treatment of rheumatic and other troubles, especially by Dr. Thos. J. Mays, of this city, who strongly urges the use of a hypodermic solution of theine, somewhat analogous in composition to Tanret's, but containing, in addition, sodium chloride. As this solution may not be generally known among pharmacists, its formula may be of value. It is as follows: Triturate theine, 64 grains, with sodium benzoate, 60 grains, and sodium chloride, 10 grains; adding sufficient distilled water to measure, after filtration, one fluidounce. Filter. Every five minims contain two-thirds of a grain of theine. Dose, five to fifteen minims.

Of the various salts of caffeine, or theine more correctly, found in commerce, the so-called citrate is the one most largely used, then follows the alkaloid, and then in minor quantities, the benzoate, nitrate, hydrochlorate, valerianate, salicylate, sulphate, tannate and hydrobromate.

In regard to the salts of caffeine or theine, Gmelin¹ states that caffeine forms with H_2SO_4 an acid and a normal salt, which dissolve more easily in water than in alcohol, but which solutions evaporated, precipitate out the alkaloid and not the sulphates; with HCl caffeine forms a hydrochlorate which, on the addition of water or alcohol, crystallizes out a considerable quantity of hydrated caffeine; with HNO_3 , there is formed a definite compound, which solution, on evaporation, similarly precipitates its combined caffeine.

Likewise, in regard to the solution of the hydrobromate, the writer has found that if it be evaporated, almost all the caffeine will be precipitated out, letting free the combined hydrobromic acid.

These statements would indicate then, that the chemical affinity between the alkaloid and the acid is but a feeble one at best, and that a solution made from the two is far better than a solution made direct from the ordinary commercial salt.

E. Merck of Darmstadt, in his April bulletin calls them all true

¹ Gmelin, (Cavendish edit.) vol. 13, p. 232.

salts, but there seems to be very good grounds for believing on the authority of Günther, and latterly, Hager and Haakman, that the citrate and valerianate as obtained in commerce are simply mixtures of the alkaloid with adhering citric or valerianic acid. Indeed, it is not long ago, the writer has been informed, that Dr. Hager, recognizing this fact, advised pharmacists to mix one-third citric acid with two-thirds theine, whenever their customers wished theine or caffeine citrate. Probably, Merck solved the difficulties in the way of its making, but as yet, the process has not become public.

Of all the possible salts of theine—the term is here used synonymously with caffeine—the hydrobromate would seem to be the one whose chemical character would most consistently give the best therapeutical action. The sedative alkaloid theine, being in combination with the sedative hydrobromic acid, the action of theine hydrobromate should be doubly happy. True the percentage of the acid is small, but, all things equal, it should, theoretically, be the best.

Reasoning on this basis, the writer constructed an elixir of theine hydrobromate, which was tried medicinally, and the results obtained would seem to justify the highest expectations formed in regard to it. The formula used is as follows :

Take of :

Theine.....	ʒ iss
Dilute Hydrobromic Acid.....	fʒ i
Water.....	fʒ i
Elixir of Orange.....	q. s. ad oi.

Dissolve the theine in the water and hydrobromic acid, with the aid of heat, filter and add the orange elixir. Dose : 1 to 3 teaspoonfuls. The product is a clear, transparent, water-white liquid ; pleasantly bitter in taste ; almost neutral in reaction, miscible with an equal volume of alcohol without precipitation. Each teaspoonful contains one grain of anhydrous theine hydrobromate ($C_8 H_{10} N_4 O_2 HBr$):

Absorption of Lead Chromate—Experiments made on animals with the pure salt, have led Dr. John Marshall to the following conclusions :—1. Absorption of lead and chromium takes place upon administration of lead chromate. 2. Owing to the insoluble nature of the salt, absorption takes place very slowly. 3. It is most likely that the absorption of lead takes place in the stomach and not in the intestinal tract. 4. The chromium of the decomposed lead chromate would be absorbed in the stomach as chromic chloride, and in the intestines as sodium chromate. *Therap. Gazette*, Feb. 1888.

SHOULD FORMULÆ FOR THE POPULAR ELIXIRS BE INCORPORATED IN THE PHARMACOPŒIA ?

BY GEO. M. BERINGER, PH.G.

Read at the Pharmaceutical Meeting, May 15.

As the time for the next decennial revision of the national standard approaches, it becomes of material importance that pharmacists throughout the country should take note of those preparations, the use of which is increasing, and of those, the use of which is declining or which are not used at all. It is intended that the Pharmacopœia should be the authority for all medical preparations of frequent use and comparatively few of the officinal preparations are more frequently prescribed than some of the elixirs. In a decade, there occur so many changes in medicinal usage that it becomes necessary to omit some of the officinal preparations and others must be added. It is not only a subject of interest, but probably a duty, that desirable changes should be discussed by pharmaceutical bodies. This is my only excuse for introducing the subject here. It is the hope of the writer that the next revision will result in a practical work which will be not only the official standard, but will be universally adopted by the pharmacists of America.

In the last revision the committee took a step in the right direction in adopting a formula for elixir aurantii or simple elixir, and also in making vinum ferri amarum officinal. The elixirs, as a class, were looked upon as semi-proprietary preparations, introduced by manufacturers to meet the popular demand for elegant preparations, the popularizing of which it was not thought desirable to promote. Elegant pharmacy and elegant preparations should not be confined to the laboratory of the manufacturer; but in the store, behind the prescription counter, in the work of each individual pharmacist, should we see it illustrated.

But one small concession was made, namely, the introduction of a simple elixir which might be used as a base for the various preparations. While I do not care here to criticize that formula I can safely say that no manufacturer or pharmacist would expect to successfully use the same liquid to disguise alike saline, bitter and astringent substances. Again, in the preparation of the popular elixir of iron, quinine and strychnia, and similar preparations, the flavoring ingredients have to be added in the course of the manipulation.

Since this revision, the use of elixirs has steadily continued, sub-

ject, of course, to such variations in use as we meet in fluid extracts, tinctures, syrups, etc., and to such restrictions as are due to locality, prejudice and that growing "fashion in medicine."

Thinking that it might not be entirely without value, I have made a computation as to the proportion of prescriptions containing some representative of this class and also the frequency of use of each. These data were obtained by examining one thousand prescriptions for each of the years 1884 to 1888 inclusive. The results I have tabulated as follows:

	1884.	1885.	1886.	1887.	1888.	Total.
ELIXIRS.	1,000 R.	1,000 R.	1,000 R.	1,000 R.	1,000 R.	5,000 pre- scriptions.
Elixir Aurantii.....	7	8	10	15	15	55
" Ammon. valer.....	3	1	1	1	1	7
" Bismuth.....		1	1	1		3
" Cascara.....		1	1	1	2	5
" Cathartic.....	1					1
" Cinchona.....	23	13	12	8	10	66
" Cinchona and iron.....	4	7	2	4	2	19
" Cinchona, iron and strychnia...	1	1				2
" Cinchona, iron and bismuth.....		1				1
Curacao	2	5	1	2	2	12
Elixir Eucalyptus comp.....					1	1
" Gentian.....	2			1		3
" Gentian and Tr. iron.....	1		1			2
" Glycyrrhiza arom.....	1	2		1		4
" Guarana.....	1		1	1	1	4
" Ferri.....		1				1
" Ferri, quiniæ et strychniæ.....	4	6	13	9	8	40
" Lactopeptin.....		1	2	3		6
" Lithium bromide.....	1					1
" Pepsin.....	1	1		1	1	4
" Pepsin and bismuth.....		1		1	1	3
" Pepsin, bismuth and strych.....					1	1
" Phosphorus comp.....				1		1
" Potassium bromide.....		2	1	1		4
" Rubrum.....				1	2	3
" Taraxacum comp.....		1	2	2		5
" Viburnum prunifolium.....		1				1
" Avena sat. (prop.).....	1					1
" Hydrastis comp. (prop.).....	1					1
Total.....	54	54	48	54	47	257
Number of physicians prescribing above elixirs.....	39	40	37	37	24	

Mr. W. L. Turner of Philadelphia in his analysis of 1,000 prescriptions (see Proceedings Penn. State Pharm. Assoc., 1886) reports 59 prescriptions containing elixirs, the most frequently used being the elixir of iron, quinine and strychnia 16 times and elixir of cinchona 17 times. He likewise compares his figures with those given by Dr. Eccles for San Francisco and Brooklyn. I abstract as follows:

San Francisco,	Brooklyn,	Phila.,
Elixirs in 1,000 R 54	108	59
Elixir calisaya " 37	29	17

The figures given by Mr. Turner, tally very closely with my own observations, and indicate that elixirs are not of local use only, but are used more or less throughout the entire country.

In connection with this subject, it is worth mentioning that the popularity of elixirs seems to be extending to foreign countries. The Pharmacopœia Germanica, 1882, contains formulæ for elixir amarum, elixir aurantiorum compositum, and elixir e succo liquiritiæ.¹ The Pharmacopœia Belgica, 1885, formulæ for elixirium cocæ, elixirium Gari and elixirium Stoughton. The Farmacopea Mexicana, 1884, has formulæ for five elixirs. The Farmacopea Italiana, 1887, contains formulæ for 55 elixirs, among them being elisir china china, elisir di citrolattato di ferro, elisir di coca di Fournier, elisir di pepsina di Mialhe.

There being no official formulæ for elixirs every manufacturer and every pharmacist has his own ideas as to how they should be made. Under the present conditions a physician prescribing elixir cinchonæ may obtain from the druggist a preparation containing 1, 2 or 5 grains of alkaloids of cinchona to each fluidounce. A prescription for elixir of iron, quinine and strychnia may be compounded with a preparation containing 2 grs., 4 grs., or 8 grs. of quinine to the fluidounce; strychnia $\frac{1}{16}$ gr., $\frac{1}{8}$ gr. or $\frac{1}{4}$ gr. to the teaspoonful. His elixir of pepsin may be 2 grs., 3 grs. or 5 grs. to the teaspoonful; while his elixir of guarana may vary from 10 grs. of guarana to 80 grs. to the fluidounce. The various preparations sold vary as much in appearance as in strength. That from such a variety of preparations of vary-

¹ These three elixirs and several of those following have been used in Europe for a century or more. Several dozen formulas for elixirs—however differing in their nature from those now in use here—were published sixty years ago in the Universal Pharmacopœia, edited by A. J. L. JOURDAN, and subsequently a larger number in GEIGER'S Universal Pharmacopœia, edited by FR. MOHR—Editor Am. Jour. Phar.

ing strengths the physician must obtain results deprived of certainty and uniformity is evident. The writer has not unfrequently heard it said by a customer for whom a prescription containing some elixir had been compounded, "this medicine tastes different from what Mr. Jones, or Mr. Smith compounded for the same."

That the necessity of adopting uniform formulæ is becoming appreciated is evident from the fact that a committee has been appointed to prepare a national unofficial formulary, and have now nearly completed their labors. I do not wish to detract one iota from the value of their work, but I submit it as an open question, Is it desirable to have a middle party, or go-between, in preparations which rank in frequency of use and importance with fluid-extracts, tinctures and syrups? There should be but one authority, and that authority should be the national standard.

That the Pharmacopœia should permit uncertainty to longer exist, in preparations contained in from 5 to 10 per cent. of the prescriptions compounded, seems hardly possible. It would indicate that the committee on revision were attempting to blindfold themselves to the onward march of pharmacy.

The elixirs, as a class, have come to stay, and the time is ripe for the next Pharmacopœia to stamp its insignia of authority upon those preparations which are daily prescribed.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for THE AMERICAN JOURNAL OF PHARMACY.

INCOMPATIBILITY OF CHLORAL AND CYANIDE OF POTASSIUM. A pharmacist while preparing an ointment of chloral and potassium cyanide $\bar{a}\bar{a}$ 10 gm. and lard 30 gm., found on mixing the first two substances, a reaction which sent them flying from the mortar. Blarez and Denigès in investigating the cause did not meet with so violent a reaction, but found changes which led them to the following conclusions: In preparing solutions of chloral and cyanide, the substances should be dissolved separately. This method adds also to the stability of the preparation, especially if the quantity of liquid used be large enough to lessen the chances of decomposition. But the authors think that physicians should abstain from associating chloral with potassium cyanide, the mixtures being really incompatible. As to the ointments, immediate reaction may be prevented by triturat-

ing the substances separately with the excipient. But the mixture turns brown in a few minutes, with disengagement of hydrocyanic acid. Unguents of this nature should be rejected absolutely from therapeutic uses. *Bul. de la Soc. de ph. de Bordeaux; Arch. de phar.*, May 5, 1888.

CYANIDE OF MERCURY. Stellden, a Swedish doctor has used the following formula in 1400 cases of diphtheria (since the year 1882), and claims that the number of deaths has been only 69, or less than 5 per cent., while the mortality in the same district had been over 92 per cent.; Cyanide of mercury, 0.02 gm.; tinct. aconite, 2 gm.; honey, 50 gm.; mix. Dose, a teaspoonful every 15, 30 or 60 minutes according to the age of the patient. The throat should not be scraped, but a gargle of cyanide of mercury of 1 to 10.000 aq. menth. should be used every 15 minutes. The frequent small doses create, according to the author, a medium in which the diphtheritic bacillus cannot live. *L'Union phar.*, April, 1888.

COMMERCIAL GLUCOSE IN ITALY. Alessandri of the Pavia University analyzed six samples and gives the average of his results as follows: Water 15.216; chloride of calcium, 6.436; pure glucose, 56.764; foreign organic matter, 21.314; insoluble mineral matter and loss, .270 = 100.000. He suggests that a law be passed compelling the use of sulphuric instead of hydrochloric acid in effecting saccharification. *Boll. farm.; Répert. de phar.*, April, 1888.

SUGARS OF HESPERIDIN AND NARINGIN.—Mr. Will in a communication to the *Société Chimique*, says: In heating hesperidin or naringin with dilute sulphuric acid we obtain insoluble products which are identical. The first gives the phloroglucinic ether of paraoxycinnamic acid and the second that of oxypara-methoxy-cinnamic. As to the soluble products remaining in the water, they were supposed to be different, the sugar of hesperidin being considered as glucose, and that of naringin being regarded as isodulcitol. The syrup obtained from hesperidin is not pure; we only verify the existence of the glucose by reduction and fermentation. But the syrup of naringin gives the same reactions and the extraction of isodulcitol from this product is difficult to effect. The author has succeeded in isolating isodulcitol from the syrup of hesperidin. He used Fischer's process, treating the syrup with phenylhydrazine. A composite mixture of isodulcitol and phenylglucosazone was produced, which was separated

by hot acetone, in which the latter is insoluble. Thus, the author concludes that the saccharine matters of hesperidin and naringin are identical.—*J. de Ph. et de Chimie*, March 15, 1888.

"A COMPLETE ALIMENT."—Adrian proposes a powder as follows, which is intended to replace the meat-powders in common use for weak and convalescent patients: Powdered roast beef, 200; powdered broiled bread (previously saturated with meat juice), 200; powdered vegetables, 200; sugar of milk, 150; tapioca, 150; dextrin, 50; malt, 50;=1000. One part of the powder represents five parts of the substances when fresh. The preparation is made in a granulated form and is readily miscible with soups, etc.—*J. de Ph. et de Chim.*, April 1, 1888.

FALSIFICATIONS IN POWDERED SAFFRON.—Rietsch and Cornil (*J. de Ph. et de Chim.*, March 15, 1888), examined 79 samples of this substance and found that 49 of them were adulterated. Of these, 31 contained florets of carthamus; 4 contained santalum rubrum; 1 was adulterated with curcuma domestica, and 1 was fortified with oil; 5 contained red woods and petals not determined. Seven were double falsifications, of which 4 contained carthamus with santalum or other red woods and a red flower with an admixture of oil. Red woods and amylaceous matters were also found.

BINITROCREOSOL AND OTHER COLORANTS TO REPLACE SAFFRON.—The use of binitrocreosol in alimentary substances has been prohibited in Germany. Weyl (*An. di Ch. e di Farm.*) states that this product produces toxic symptoms in doses of 25 cgm. per kilo of the person who ingests it. The symptoms are tetanic spasm, pupilar rigidity, difficulty of respiration and, in animals, death in 20 to 30 minutes. As commercial binitrocreosol contains about 40 per cent. of ammonia the toxic energy of the pure substance is correspondingly great. The amount necessary for coloring butter, margarin, conserves or liquors is very small; but the writer thinks that small quantities will give rise to toxic conditions of a chronic nature. The pure "Martius Yellow" used as a lime or ammonia salt is inoffensive. The "butter yellow" discovered by Griess, may be easily substituted for binitrocreosol and does not enter into the category of poisons. Weyl describes it as "a combination of the diazotic derivative of aniline and of dimethylaniline."—*Répert. de phar.*, April, 1888.

TO PULVERIZE BORACIC ACID.—The acid is placed in a vessel with a sufficient quantity of boiling water to dissolve it. The mixture is then vigorously agitated with an egg-beater until it cools, when it gives a deposit of microscopical crystals. These are *partially* dried between sheets of filtering paper and may then be quickly reduced to impalpable powder in the mortar. The quantity remaining in solution—which is very small—may be regained by evaporation, or the same liquid may be used again for the same purpose.—*Le monde pharm.*, May 5, 1888.

POTASSIUM BICHROMATE IN GLUE.—It is well-known that bichromate renders glue and gluten insoluble, whence its value in the sizing of various fabrics. The *Revue Scientifique* gives the proportions at 1 of bichromate to 50 of the glue mixture; the bichromate should be added just before using.

USES OF THE IODOPHENOLS.—According to the *Moniteur Scientifique*, these new colorants will have an important application in dyeing, their blue and violet tints being remarkable for durability, while the cost is very low. The process of dyeing with blue iodophenol is very simple and differs but little from that with indigo. The reductive product of iodophenol is prepared by diffusing the blue iodophenol paste in alkaline liquor with glucose, and heating to 80° [176° F.]. The mixture takes a greenish hue and has a striated appearance with bronze reflexes on its surface. The liquor is then diluted with warm water, when the cotton fabric is dipped. When the proper shade of color is obtained the fabric is pressed and exposed to the air, or to an oxidizing bath; the latter is best made with an ammoniacal solution of a cupric salt.

ARTIFICIAL RUBIES.—Frémy and Verneuil (*Acad. de Sci.*, Feb. 27, 1888), report important improvements in their product. The process as announced a year ago, consisted in the reaction at high temperature of barium fluoride upon alumina containing traces of bichromate of potassium. The crystals were lamellated and friable. By recent changes in manipulation, hard and regularly formed crystals are obtained, perfectly transparent and of great brilliancy. Mr. Des Cloizeaux, the mineralogist stated to the Academy that these crystals were identical with those of naturally formed rubies. The authors will continue their experiments on a more extended scale.—*Monit. Sci.*, April, 1888.

METHODS FOR DEFINITELY PROVING THE PRESENCE OF
COTTON OIL OR OF OIL OF SESAME IN OLIVE OIL¹.

BY M. MILLIAU.

The author has applied Becchi's test (*Amer. Jour. Phar.*, 1887, p. 280), based upon the reducing action of cotton oil upon argentic nitrate, but he finds that some varieties of the pure olive oil give a slight reduction, owing to certain causes which he points out. If, however, the fatty acids be first separated and the test be then applied to them, the acids from pure olive oil give no reduction, while those from cotton oil always reduce the silver. On this assumption he has based the following process:—Place 15 cc. of the oil into a porcelain basin and warm it up to 110° C. Make a mixture of 15 cc. of a solution of sodium hydrate (40 degrees Baumé) with 15 cc. of alcohol of 92 degrees, and add this solution very gradually to the heated oil, taking care that the temperature is maintained during the process. When a homogeneous mass has been obtained, distilled water is added drop by drop, so as not to cool the paste or to form clots, and this is continued until 500 cc. of water have been introduced. The whole having been boiled for a few minutes, dilute sulphuric acid (1 in 10) is added, so as to produce a slight excess of acidity and the fatty acids are thus obtained floating on the surface. The author does not seem to consider it necessary to wash these acids, but he simply removes about 5 cc. by means of a silver spoon, and puts this amount of the separated acids into a test tube with 20 cc. of alcohol, and warms until dissolved. To this liquid he adds 2 cc. of a 30 per cent. solution of argentic nitrate, and heats the whole on the water bath until about one-third of the fluid is evaporated off, when the test is complete. If the olive oil be pure, the fatty acids remain unaltered, but if cotton oil be present the acids float to the surface as a black paste. By this method the author has easily detected a one per cent. adulteration.

For Sesame Oil.—To recognize the presence of this oil in olive oil, the author finds that Baudouin's reagent is the best, but here also a pure oil may be unjustly condemned when working on the oil itself. If, however, the separation of the fatty acids be first carried out, the results are accurate. In this case, after saponification and separation of the acids, they must be perfectly dried at 110° C. They are then put into a tube and shaken up with Baudouin's reagent (hydrochloric acid and sugar), when the characteristic red color will be produced.

¹ *Arch. de Pharm.*, 3, 161. Reprinted from *The Analyst*, May, 1888, p. 95.

THE ACTION OF FINELY DIVIDED METALS ON SOLUTIONS OF FERRIC SALTS, AND A RAPID METHOD FOR THE TITRATION OF THE LATTER.

By DOUGLAS J. CARNEGIE, B. A., Demonstrator in Chemistry, Gonville and Caius College.

1. It is universally admitted in text-books that of existing methods for converting ferric salts into ferrous salts prior to titration with potassium permanganate, the safest and best, though by far the slowest, method is to boil the acidified ferric solution with zinc in an inert atmosphere. The more rapid methods (excluding the stannous chloride method, which is not applicable if permanganate titration be employed) are hampered by the facts that in their employment it is difficult to determine the point of exact reduction, and excess of the reducing agent is as fatal as defect.

It seemed to me that the safest method might be so modified as at the same time to make it a rapid one, by increasing the effective surface of the zinc through the employment of zinc-dust in the place of the usual granulated zinc. While experimenting in this direction, I found that zinc-dust *instantly* reduces ferric to ferrous salt, *and this even in neutral solutions*. At the same time, if the solution is neutral, iron is precipitated partly as ferrous, partly as ferric hydroxide. In acid solutions, no iron is precipitated, but the reduction is less rapid the more free acid there is present. In every case zinc goes into solution.

2. Very rapid and accurate estimations of ferric solutions are realized by the following method:

The bottom of a dry and narrow beaker is covered with zinc-dust, which has been sifted through fine muslin. A known volume of ferric solution, previously nearly neutralized by ammonia, is now delivered into the beaker, and shaken briskly with the zinc-dust. Finally, a known volume of dilute sulphuric acid is added, and the contents of the beaker are once more shaken. It is essential for rapid reduction that the above order be observed; the nearly neutral ferric solution must *first* be added to the zinc, *then* the acid. In order to withdraw for titration a definite volume of the ferrous solution free from particles of undissolved zinc, I make use of the "reversed filter."*

* A glass tube, one end of which is covered, first with muslin, then with filter paper, held in position by an india-rubber ring.

When this filter is immersed in the beaker, the clear ferrous solution rises in it to the same level as the liquid in the beaker, and may then be withdrawn by a pipette. The object of the muslin is to prevent rupture of the filter-paper by the narrow end of the pipette. A titration which formerly demanded an hour or more can be executed by this method in three or four minutes with an accuracy deducible from a comparison of the following numbers selected at random from a series of titrations in which no especial refinements were employed :

25 cc. of an acidulated ferric chloride solution reduced by iron-free magnesium required 15.3 cc. of a decinormal permanganate solution.

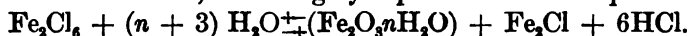
25 cc. of same solution reduced as above required 15.2 cc. of same permanganate solution.

If one is to judge from Aldendorff's analysis of a typical specimen of zinc-dust (Frémy's *Encyclopédie*), this substance is usually free from iron. The specimen with which I worked contained only 0.08 per cent. of iron, or rather reducing substance equivalent to 0.08 per cent. iron.

3. As to the nature of the reaction between zinc-dust and neutral ferric chloride, I was at first inclined to ascribe the efficacy of the dust in this respect to the occluded hydrogen which, as Greville Williams has shown, is always contained therein. I was all the more strengthened in this view by experiments which showed that hydrogen occluded by palladium quickly reduces ferric chloride in solution. It is interesting in this connection, coupled with the experiments of Gladstone and Tribe, to note that hydrogen occluded by platinum has no action on ferric salts.

To put this hypothesis to the proof, I heated some of the zinc-dust in a Sprengel vacuum till all the hydrogen was given off; I then tried the action of the volatilized zinc crystals on ferric chloride. Their reducing power was unimpaired; hence I had to seek for a new explanation.

It is well known that ferric chloride in aqueous solution is in a state of partial dissociation, as is roughly represented in the equation—



It might be urged that on adding zinc-dust to such a system, the hydrochloric acid would be removed from the sphere of action, with formation of zinc chloride and hydrogen, and that the nascent hydrogen would reduce the ferric chloride existing as such, while the soluble hydrated iron oxide might in virtue of this upsetting of the mo-

bile equilibrium be simultaneously transformed into an insoluble hydrated form. According to this explanation it would follow that more iron hydroxide would be precipitated the higher the temperature at which reduction takes place, for the dissociation of ferric chloride increases with the temperature. And, indeed, experiment proved that about twice as much iron is precipitated as insoluble hydroxide when the reduction is effected at 100° as when it takes place at ordinary temperatures. But according to this explanation, one would predict the improbability of reduction if absolute alcohol were substituted for water as the medium of the change; whereas experiment shows that even under these conditions reduction readily takes place with great rise of temperature.

4. I am thus driven to the conclusion that the zinc acts merely as a dechlorinating agent, much as stannous chloride acts— $\text{Fe}_2\text{Cl}_6 + \text{Zn} = \text{ZnCl}_2 + \text{Fe}_2\text{Cl}_4$, and that the precipitate of iron hydroxides which occurs in neutral solutions is partly due to the zinc oxide which is always present in the dust to the extent of about 50 per cent., partly to the zinc hydroxide formed during the reduction by the action of water on the finely divided zinc. Zinc-dust merely effects instantaneously the dechlorination which I found zinc-foil required several hours to effect.

The change represented above is an exothermic one; the heat of formation in aqueous solution of ZnCl_2 [112,840] is greater than the negative thermal change in the passage from the system $\text{Fe}_2\text{Cl}_6, \text{Aq}$ to the system $\text{Fe}_2\text{Cl}_4, \text{Aq}$ [55,540].

5. If this explanation of direct dechlorination be valid, it seemed probable that all those metals whose chlorides have a heat of formation in aqueous solution greater than 55,540 gram-units would, in the finely-divided state, reduce ferric solutions. I have made many experiments in this direction, and I find that the following metals in a finely-divided state reduce ferric solutions with varying degrees of rapidity:—iron, mercury, silver, aluminium, and copper, as well as zinc. Sometimes the metals were employed in the shape of foil [aluminium, copper silver], sometimes in the state of fine division in which they are precipitated from boiling alkaline solutions of their formates, or from hot solutions of any of their salts by means of zinc-dust, followed by repeated digestion with dilute acids suited to the occasion. In the cases of aluminium and silver, it was definitely proved that no precipitation of a salt of iron occurred. This, without doubt, would

be the case with all metals M'' where $M'' + H_2O = M''O + H_2$, represents an endothermic change. Platinum and gold do not reduce ferric solutions. Now, with the exception of the last two named, the heats of formation of the chlorides of all the foregoing metals are greater than 55,540. Nevertheless, the *rapidity* of reduction by a metal does not appear to be a function of the energy which runs down in the formation of its chloride, thus $[Al^3, Cl^0, Aq] = 475,650$, whilst $[Zn, Cl^2, Aq] =$ only 112,840; yet zinc reduces instantaneously, whilst aluminium reduces the most slowly of all the metals experimented with. But experiment showed it to be undoubtedly the case that those metals reduce the quickest which are the most readily attacked at ordinary temperatures by dilute chlorine-water. It is of interest to note that galena in a finely-divided state also reduces ferric chloride solution, whereas antimony sulphide has not this power.

6. From the whole of my experiments, I conclude that zinc-dust is practically the best reducing agent for the purpose in hand. True it is that zinc-dust may sometimes contain a little iron, and that titration with permanganate cannot be conducted in an acid solution containing zinc, but that the latter must be first removed. But, in the first place, zinc-dust contains so little iron, and so slight a solution of zinc takes place before titration by my method, that any error arising from this source is negligible. However, in the attempt to elaborate a method which would preclude *any* uncertainty on this point, I prepared zinc-dust free from zinc oxide, as recommended by Sabatier, by means of repeated digestion with dilute acid, and also by what I found to be a more rapid method, *viz.*, by digestion with solutions of ammonium chloride and ammonia, in both cases finally drying the product on porous tiles in a vacuum. This purified zinc was shaken up with a standard ferric chloride solution *without the addition of any acid*; the ferrous solution was filtered off, acidified, and titrated; but the iron was not fully accounted for in the filtrate, so rapidly does water attack the finely-divided zinc with formation of hydrogen and zinc hydroxide; the latter precipitating solutions of iron salts in contact with it. In fact, in solutions of several metallic salts, $MgCl_2$, $Al_2(SO_4)_3$, $Co(NO_3)_2$, $MnSO_4$, etc., finely-divided zinc very soon causes a precipitate either of the hydroxides or of basic salts of the metals present.

In the second place, even when the reduction is effected by metals

which can easily be obtained absolutely free from iron, which are not oxidized by water, and which do not evolve hydrogen with dilute acids, separation from the finely-divided metal *must* always precede titration; for even silver and aluminium are attacked in feebly acid solutions by permanganate.

7. Mitscherlich (*Zeit. anal. Chem.*, II, 72) has stated that in the reduction of ferric solutions it is absolutely necessary that the whole of the zinc should be dissolved before titration; the reason adduced being that iron is precipitated on the surface of the zinc, and does not dissolve until the last traces of the zinc themselves disappear. If this statement be accurate, objection may be taken to my method detailed above; but I much doubt its accuracy. Experiment showed that the titre of an acidulated iron solution was independent of the time it had remained in contact with the zinc-dust. This might be explained in this special case by supposing the finely divided zinc to be practically enveloped in a protecting layer of hydrogen, but other experiments would lead me to believe that such a supposition is unnecessary. Examination of pieces of granulated zinc free from iron removed either before or after complete reduction of both hot and cold ferric solutions, always failed to give evidence of iron. Beebe's method of reducing ferric solutions (*Chem. News*, LIII, 269) would also be untrustworthy were Mitscherlich's statements correct. Without doubt the zinc in all cases becomes coated with a black deposit, which as Rodwell, Vogel, and others have shown, contains *in addition to the iron present originally in the impure zinc itself*, zinc combined with lead, sulphur and carbon.

8. After the work of which this paper is a short account was finished, I casually came across a reference in Frémy's *Encyclopédie* to a paper by Brown, on the reduction of ferric compounds by zinc. I have procured the paper referred to (*Iron*, 1878, 361), and find that Brown's method consists in reducing iron ores directly by fusion with *pulverized* zinc (Hobson and Sylvester had shown that at a temperature of 205° zinc becomes so brittle that it may be powdered in a mortar). Brown has also used this pulverized zinc to reduce ferric salts in acid solutions; but that his method is founded, as is the current one, on the reducing action of nascent hydrogen, and not on the direct reducing powers of the zinc, is obvious from the following quotation:—"There should be but a very small excess of sulphuric acid present, so that at the end of an hour or two only about half the zinc will be dissolved."

Brown is also of opinion that the whole of the zinc must be dissolved before titration, but he does not state his grounds for that opinion.

I prepared some pulverized zinc, by Hobson and Sylvester's method, but with three different specimens of zinc. I uniformly found that they did not become brittle at 205° but at higher temperatures, and also that it was impossible thus to obtain anything approaching the fine division of zinc-dust. The pulverized zinc obtained reduced neutral ferric solutions but slowly.

In conclusion, I would express my thanks to Mr. Pattison Muir for the kindly suggestive interest he has taken in the work detailed.—*Jour. Chem. Soc.*, May, 1888, 468–473.

VAPOR-DENSITY OF FERRIC CHLORIDE AT VARIOUS TEMPERATURES.

By W. GRUNEWALD and V. MEYER.*

In these experiments, sublimed ferric chloride was used. The estimations were made in a slightly modified form of V. Meyer's apparatus, in which the bulb, 45 mm. in diameter, was reduced to a length of only 125 mm., whilst the whole apparatus was 670 mm. high; by this means the whole of the bulb acquired the temperature of the bath. For greater convenience in filling with nitrogen, a thin tube was fused into the bottom of the bulb, bent so as to follow the shape of the bulb and stem until the side tubes were nearly reached, then bent at right angles to connect with the nitrogen supply.

A new device of Meyer and Biltz for the introduction of the substance is also described: On the stem, opposite to, but just below the delivery tube, a short side tube is fused; through this passes a glass rod whose end projects across the stem; the joint between rod and side tube being made with well-fitting caoutchouc tubing. The little bottle containing the substance rests on the end of the rod; when the bulb has attained the required temperature the rod is slightly withdrawn, and the bottle falls into the bulb.

Four determinations at 448° (in sulphur vapor) gave a density of 10.487, whilst that required by the formula Fe_2Cl_6 is 11.2. After the estimation the contents of the bulb did not give the slightest reaction

* Ber. 21, 687–701, reprinted from "*Jour. Chem. Soc.*," May, 1888, p. 422.

for ferrous salt. Experiments at a lower temperature were out of the question, as even in these the vaporization was rather slow.

At 518° (in vapor of phosphorus pentasulphide), three experiments gave a vapor-density of 9.569; about $\frac{1}{10}$ of the iron was found to be in the ferrous condition after the estimation.

At 606° (in vapor of zinc chloride), in a smaller apparatus, six experiments gave a mean vapor-density of 8.383; about $\frac{1}{8}$ of the iron was in the ferrous state at the close.

The determinations at higher temperatures were effected in platinum apparatus heated in a Perrot's gas furnace. The mean of three estimations at about 750° gave a vapor-density of 5.406, whilst about $\frac{1}{3}$ of the iron was found to be in the ferrous state at the close of the experiments. At about 1050° , the numbers obtained for the density were 5.3 and 4.9; $\frac{1}{4}$ and $\frac{1}{5}$ of the iron being respectively found in the ferrous state. The results at 1300° were practically identical with those at 1050° . As it seemed probable that the lower results in the higher temperature experiments might be due to the action of the platinum on the ferric chloride, experiments were made in platinum apparatus at about 600° , but the results obtained were in agreement with those previously got in glass.

With regard to the amounts of ferrous salt observed at the end of the experiments, it must be remembered that this does not show the amount of dissociation that occurred at the temperature of the experiment, inasmuch as recombination occurs on cooling.

Experiments in a chlorine atmosphere at the temperature of boiling sulphur and boiling phosphorus pentasulphide respectively, gave practically the same results as those in an atmosphere of nitrogen.

From these results it follows that ferric chloride does not at any temperature show a vapor-density sufficiently high for the molecular formula Fe_2Cl_6 , whilst at 750° and 1077° numbers were obtained not far removed from 5.6, the calculated vapor-density for the molecular formula FeCl_3 .

Crude Sulpho Carbollic Acid as a Disinfectant.—Laplace, (*Deutsche medizinische Wochenschrift*, No. 7, 1888), mixes sulphuric with an equal weight of crude carbollic acid (twenty-five per cent. in strength) which yields a blackish, syrupy liquid soluble in water. A four per cent. watery solution of this compound destroyed the virulence of anthrax in forty-eight hours. Creolin, is impotent in solutions of two per cent., to destroy anthrax; the acidified solutions of corrosive sublimate (1 to 1000) are potent against anthrax, but are not so available in practice.

ANCIENT MATERIALS FOR PAPER MAKING.

It has been generally believed that linen rags have been used in the manufacture of paper only since the fourteenth century, and that previously to that the writing materials of the East were chiefly made from unmanufactured materials. This view must be considerably modified in consequence of a careful microscopical examination made by Dr. Julius Wiesner, of the paper from El-Faijûm preserved in the Austrian Museum at Vienna in the collection known as "Papyrus Erzherzog Rainer." Many of these papers extend to the ninth, and some are even as old as the eighth century. The papers are all "clayed" like modern papers.

Dr. Wiesner's examination gave the unexpected result that these papers were all manufactured from rags. The fibre is mainly linen among which are traces of cotton, hemp and of some animal fibre; well-preserved yarn threads are of very frequent occurrence. The manufacture of paper out of rags is not, therefore, as has hitherto been supposed, either a German or an Italian invention, but is an Eastern one. In addition to the Faijûm papers, he examined also more than five hundred Oriental and Eastern specimens from the ninth to the fifteenth century, not a single one of which was a raw-cotton paper; all were manufactured from rags, the chief ingredient being linen.

The examination of the substance used for "claying" gave equally unexpected results. In all the Faijûm papers this was found to be starch-paste, a substance which had been supposed not to have been used for this purpose before the present century; animal substances do not appear to have been employed for "claying" before the fourteenth or fifteenth century. In some instances well-preserved starch-grains were mingled with the paste; these agreed, in form and size of the grains, with wheat starch, and were evidently prepared starch separated from the meal. In two papers, belonging to the tenth and eleventh centuries, buckwheat-starch was found, and the cultivation of this substance must, therefore, be dated back to the tenth century. The object of the "claying" was apparently to increase the whiteness of the paper.—*Phar. Jour. and Trans.*, April 14, 1888.

Methalal (see *Amer. Jour. Phar.*, 1887, pp. 19, 198, 267,) is regarded by Dr. H. Kraft as the best agent, when given hypodermically, for producing sleep in delirium tremens, particularly in an anæmic condition of the patients.

NOTES ON IPECACUANHA WINE.¹

By C. A. MacPHERSON.

The more important of previous publications on the subject were reviewed, and numerous experiments by the author himself were recorded in detail. First, referring to the nature of the extract of *ipecacuanha* which is obtained in the course of the pharmacopoeial process, it was shown as the result of five experiments that the amount of the extract varies with the root employed. Thus, three specimens of root gave (1) 86, (2) 95½, and (3) 99 grains of the extract per oz. The first of these when used in finer powder (No. 40) gave 90¼ grains of extract; both, however, were nearly alike as to the percentage of matter insoluble in sherry—viz., 25.58 and 25.61. No. 2 extract contained 21.72 per cent. of insoluble matter, and No. 3, 23.74 per cent. Slight modification of the manner of percolating the drug was found to materially affect the nature of the extract.

The author then proceeded to show the result of percolating 8 oz. of the drug; the first 3½ oz. of percolate yielded 389¼ grains of extract, the next 7 oz. gave 34½ grains, the next 5 oz. 40 grains, other 6 fractions of 5 oz. each gave quantities diminishing from 10 grains to ¾ grain. Still other ten fractions sufficient to make the whole gallon of percolate required by the Pharmacopoeia were collected and evaporated, but the whole of them yielded only 5 grains of extract. Obviously the Pharmacopoeia carries percolation to a ridiculous excess. Further tests showed that the bulk of the emetine was removed from the root by the first portions of the menstruum, and that the *ipecacuanhic* acid is not destroyed by heat of careful evaporation—viz., 150° Fahr. The pectin substance which is found in the extract is derived from the first portion (40 oz.) of the percolate, which also contains all the acetic acid used. As to evaporation, the author was of the opinion that it is advisable to evaporate each portion of the percolate by itself, and to stir frequently so as to facilitate the escape of the acid and water vapors.

The extract should be mixed with the wine by adding the latter gradually to the former contained in a mortar, and rubbing them together so as to diffuse the extract through the liquid in the finest pos-

¹ Abstract of a paper read before the North British Branch of the Pharmaceutical Society of Great Britain; reprinted from *The Chemist and Druggist*, March 31, 1888, p. 419.

sible state of division, otherwise knots are formed which resist the action of the solvent, and if not broken up must so far weaken the finished product.

The next point taken up by the author was the nature of the precipitate which is formed in *ipecacuanha* wine on keeping. On this point the opinions of Duckworth, Johnson, Brownen, and others were quoted, and criticised in detail, the object of the author being to show that there was a want of evidence as to the reputed alkaloidal nature of the deposit. It has been stated that the deposit is formed owing to the oxidation of the *ipecacuanhic* acid; also, that it is the result of a fermentative process. These are mere conjectures to a large extent. The author had examined the old and new wines and found that all the deposits were evidently alike except that the proportions of crystalline and non-crystalline matter were reversed, the crystalline predominating in that from the new wine. Under the microscope the crystals were seen to be prismatic, the primary form, so far as could be made out, being an octahedron. The non-crystalline portion was composed of what seemed to be minute yellowish granules (generally united) with larger mycelium-like pieces interspersed. A sherry deposit was found to resemble the *ipecacuanha* wine one. On examination chemically the crystals were found to be tartrate of lime, a little magnesia also being present in those from the new wine. No potash was found in either sample examined. An examination for emetine and *ipecacuanhic* acid gave negative results. Various substances were found, but none of them related apparently to the active constituents of *ipecacuanha*, the author summing up this portion of the paper by saying that the sherry is hardly responsible for the deposit, and it is probable that the remainder constituting the bulk of the non-crystalline matter is chiefly a substance belonging to the pectic series with a small proportion of fatty matter derived from the *ipecacuanha*.

The author then gave an account of several percolation experiments, in one of which water alone was used, instead of acetic acid and water, for exhausting the root. The watery percolate on evaporation yielded a brittle extract of a yellowish-brown color and bitter taste. With reagents it gave strong evidence of the presence of emetine and *ipecacuanhic* acid. Moistened with rectified spirit, it hardened, but dissolved in diluted spirit. It contained a large quantity of gummy matter, but it was noticeable that the wine made from the extract kept longer

bright and free from deposit than the official wine. In another experiment the author showed that if the 1867 wine is heated carefully to a temperature of 180° F. and set aside to cool, there slowly separates a coagulum. Freed from this by filtration, the wine is obtained perfectly bright, and it remains in this condition for a long period.

GHATTI, AND OTHER INDIAN SUBSTITUTES FOR GUM ARABIC.¹

BY A. MANDER.

A short time ago Mr. E. M. Holmes gave me some samples of Indian gums which have recently been imported in large quantities, and suggested an examination. The results I have obtained will perhaps not be altogether uninteresting to the members of this Association.

The packages were named "Glassy Amrad," "East India Amrad," "Pale Amrad," "Oomra Whatti," and "Ghatti," which will be briefly noticed *seriatim*.

Glassy amrad is a dark gum consisting of more or less rounded, and some stalactitic pieces, with smooth shining surface and free from internal cracks. Color varying from dark-brown to pale yellow.

With the proportion of distilled water directed for mucil. acaciæ, B. P. it completely dissolved, forming a tasteless mucilage of a dark yellowish-brown color, not gelatinous, but very viscid. By passing given volumes through a burette, and comparing the times required, the viscosity was found to be 2 (muc. acac. = 1). This mucilage was strongly adhesive and readily emulsified oils, but the products were of a pale fawn color. A solution of borax gelatinized the mucilage; basic lead acetate caused a slight non-gelatinous precipitate, and dense white precipitates were formed on the addition of ammonium oxalate or alcohol; ferric chloride gave a brownish coloration.

East India Amrad.—A dark brittle gum of a reddish tint, composed chiefly of transparent angular fragments with a few rounded masses having a conchoidal fracture. When dissolved it gave a taste-

¹ From a paper read before the School of Pharmacy Students' Association; reprinted from *Pharm. Jour. and Trans.*, April 14, 1888, p. 876.

less mucilage, in color similar to that from glassy amrad, but viscosity only .51 (mucil. acaciæ=1). Very adhesive, and formed a tinted emulsion with olive oil.

A brownish, opaque thick jelly was produced by basic lead acetate; there was no gelatinization by borax, and only slight cloudiness with ammonium oxalate; alcohol readily precipitated a diluted solution and ferric chloride slightly darkened another portion.

"Pale amrad" somewhat resembles "gum acacia sorts" being in broken angular pieces or small tears, and these more or less cracked internally—some pieces may be noticed having an opaline surface.

It forms a pale yellowish brown, slightly gelatinous, very fluid mucilage, viscosity being .156. This is adhesive and emulsifies olive oil like the two previous gums, but with a product not quite so colored. A thick, curdy, opaque precipitate was given with basic lead acetate; slight precipitates were formed with neutral lead acetate and mercuric chloride; dense white with ammonium oxalate, and curdy white with both ferric chloride and alcohol.

Oomra Whatti.—A dark gum, in irregularly shaped and stalactiform pieces, clear internally but dull surface; color from reddish to pale yellow.

This gave a mucilage somewhat darker than glassy amrad, but of similar properties. Viscosity 1.8, adhesive, and emulsified oils easily. No precipitates were given with neutral or basic lead acetates, but white with ammonium oxalate or alcohol; borax gelatinized it, and ferric chloride caused darkish coloration.

Ghatti.—A pale gum consisting of rounded or vermiform pieces of varying size, clear internally, but dull and roughened on the surface, apparently caused by shrinkage in drying; from brownish-yellow to perfectly colorless and transparent. More carelessly picked than previous specimens, with woody and other foreign matter adhering.

With the same proportion of water as the other gums it formed a pale yellowish-brown semi-solid mass, very powerfully adhesive.

When diluted, the solution gave a translucent slightly gelatinous precipitate with basic lead acetate, was precipitated by alcohol, gelatinized by borax, but only a slight opalescence was produced with ammonium oxalate. By incineration, the gum yielded 2.55 per cent. of an ash consisting chiefly of potassium and calcium carbonates and traces of sulphate.

The behavior with chemical reagents is summarized in the following table:

	Glassy Amrad.	East India Amrad.	Pale Amrad.	Oomra Whatti.	Ghatti.
Basic lead acetate . . .	Slight ppt., not gelatinous.	Brownish opaque thick jelly.	Curdy opaque ppt.	No ppt.	Translucent gelatinous ppt.
Neutral lead acetate . .	White ppt.	Slightly colored ppt.	Slight ppt. White ppt.	White ppt.	Slight ppt.
Ammonium oxalate . . .	Gelatinized Brownish color.	Slight darkening.	Curdy white ppt. Slight ppt.	Gelatinized. Slight darkening. Slight ppt.	Gelatinized.
Borax	Ppt.	Ppt.	Ppt.	Ppt.	Ppt.
Ferric chloride					
Mercuric chloride					
Alcohol					

The oomra whatti and amrad gums cannot be said to have much value in practical pharmacy, though they may be well adapted for the chief uses to which the inferior qualities of gum arabic were formerly exclusively put. They contain little or no astringent principles to affect the mordants in calico printing, and for strong adhesive mucilages where color is immaterial "glassy amrad" and "oomra" seem to be very suitable. Concerning "ghatti" a little more must be said.

Another supply of mucilage was made according to the formula :

Gum ghatti.....1 ounce.
Distilled water.....3 fluid ounces.

On straining, a few grains were separated which had swollen to a translucent jelly, and these remained undissolved when treated with more water. The mucilage thus obtained is scarcely as bright as that from picked gum arabic, but quite equal to that given by ordinary good samples as to color, and at the same time more viscid. It is tasteless, inodorous, and of superior adhesive properties to mucil. acaciæ.

The emulsifying power was tried with olive oil, this being selected in preference to almond or castor oils as a more crucial test. Several emulsions were made with varying proportions of oil and ghatti mucilage as above, and some of these are open to comparison this evening with others made with the same amounts of oil and acacia mucilage prepared from selected gum.

No. 1.—Ghatti mucilage 1, olive oil 1, distilled water 62.
No. 2.—Acacia " 1, " 1, " " 62.
No. 3.—Ghatti " 1, " 2, " " 61.
No. 4.—Acacia " 1, " 2, " " 61.

It will be noted that the emulsions afforded by ghatti mucilage are,

as regards consistence, etc., quite equal to those by acacia, but preferable as to color, being of almost pure snowy whiteness. On microscopical examination the oil particles in the emulsion made with ghatti and two parts of oil appear as nearly as possible identical in size with those given by acacia and one part, or half the quantity, of oil.

After standing fifteen days the "ghatti" emulsions showed no separation of oil, and since the mucilage was made with double the proportion of water used for acacia it must be acknowledged that the emulsive power of the gum is very remarkable.

The prevention, or long delaying, of the chemical reaction between mercuric chloride and calcium hydrate in the presence of acacia mucilage is well known, and experiments were made to ascertain if ghatti also possessed this power. That it does so in a very striking degree is evident from the mixtures before you. A is quite clear, without any trace of precipitate, being made by adding a little diluted ghatti mucilage before the lime water; while B contains the same proportions of ingredients, but has the characteristic appearance of *lotio hydrargyri flava*, the mucilage being added after reaction had taken place.

I regret not having had opportunity to continue testing the properties of this gum, but from these facts it is evident that there is an article commercially obtainable at a low price which, though differing considerably in appearance from the *Acaciæ Gummi* of the *Pharmacopœia*, possesses in a marked degree many characters which have been supposed to be peculiar to it. If more care were taken in the gathering and selection there seems to be little doubt that picked qualities would speedily rise to considerable commercial value and pharmaceutical interest.

ASARONE.

By B. RIZZA and A. BUTLEROW.*

In 1884 asarone was investigated by the authors (*Am. Jour. Phar.*, 1885, p. 354), and found to be an unsaturated compound, containing three methoxyl-groups. The molecular formula, $C_{12}H_{16}O_3$, was

* *J. Russ. Chem. Soc.*, 1887, p. 12; reprinted from *Jour. Chem. Soc.*, 1888, p. 458.

ascribed to it. On oxidation it yielded a neutral, crystalline substance; this was subsequently investigated by Staats, and although his work confirms the author's results in general, the sample which he analyzed does not seem to have been pure.

In the present paper, the chemical nature of asarone is determined by the study of its products of oxidation, which are a neutral substance, an acid, and a compound derived from the latter by the elimination of a CO_2 group. Two methods are employed. In the first, the asarone (12 grams) is dissolved in strong acetic acid (40 grams) and potassium dichromate (6 grams) added; the mixture is then carefully heated until it turns green. On cooling and adding water, needle-shaped crystals separate together with a reddish-brown resinous substance. The crystals are neutral, of a silky lustre, soluble in hot water, ether, light petroleum, and benzene. They melt at 114° , but sublime even at 100° . The analysis agrees with the formula $\text{C}_{10}\text{H}_{12}\text{O}_4$. Better results are obtained by the use of potassium permanganate solution (40 grams in 750 grams water), which is added drop by drop to a warm solution of asarone (10 grams in 450 grams water). The compound $\text{C}_{10}\text{H}_{12}\text{O}_4$ is extracted from the filtrate by means of ether; the alkaline solution is then evaporated to dryness, and the residue either extracted with hot alcohol or decomposed with hydrochloric acid, and then extracted with alcohol. In the first case the potassium salt of a new acid separates out from the hot spirit, in the second the new acid itself. Carbonic, formic, oxalic, and acetic acids are formed at the same time. When the operation is conducted as described, the quantity of acid formed is much larger than that of the neutral substance, but the reverse is the case when a mixture of asarone (5 grams) and finely-powdered permanganate (7.5 grams) is added in small portions at a time to boiling water. The acid, $\text{C}_{10}\text{H}_{12}\text{O}_5$, crystallizes in needles, which are soluble in benzene, light petroleum, alcohol, and boiling water. It melts at 144° , and boils at about 300° ; it has distinctly acid properties, decomposing carbonates. Its silver salt, prepared from the potassium salt, is tolerably stable under the influence of air and light.

The neutral substance, $\text{C}_{10}\text{H}_{12}\text{O}_4$, was found to be the aldehyde of the acid $\text{C}_{10}\text{H}_{12}\text{O}_5$, as was proved by the oxidizing it with permanganate, when it was converted into the acid. Neither of these substances, however, has the properties of an unsaturated compound so characteristically exhibited by asarone. That the neutral substance is an alde-

hyde is also proved by treating it with phenylhydrazine hydrochloride in the presence of sodium acetate, when yellow crystals are obtained, melting at 120—121°, and having the formula $C_{16}H_{15}O_3N_2$. By the action of sodium amalgam on the aldehyde, two new compounds are formed, one of which melts at 62°, the other at 102°. One of them seems to be the alcohol corresponding with the aldehyde, but they were not further investigated.

Three methoxyl-groups exist in asarone, and these are also present in the aldehyde and in the acid, as is shown by heating them with hydrochloric or hydrobromic acid, when methyl chloride or bromide is formed. It is best, however, to first heat the acid or aldehyde with four times its weight of slaked lime, whereby it is converted into an oily substance of the formula $C_8H_{12}O_3$, boiling at 245—247°; this, when heated with hydriodic acid in a sealed tube yields methyl iodide, corresponding in amount with three methoxyl-groups, from which it would appear that the constitution of this oil is $C_8H_3(OCH_3)_3$; that is, the trimethyl ether of a triatomic phenol. The presence of the benzene nucleus in asarone was proved by heating it with zinc-dust, and passing the products of distillation into strong nitric acid, when nitrobenzene was obtained.

The authors conclude from the study of the reactions of asarone and the allied compounds that their constitution may be expressed by the following formulæ: Asarone, $C_8H_2(OMe)_3 \cdot CH:CH \cdot CH_3$; asarone dibromide, $C_8H_2(OMe)_3 \cdot CHBr \cdot CHBr \cdot CH_3$; the aldehyde, $C_8H_2(OMe)_3 \cdot CHO$; the acid, $C_8H_2(OMe)_3 \cdot COOH$, and the oily substance by $C_8H_3(OMe)_3$. Without regard to the position of the single group in the benzene nucleus, a striking analogy exists between asarone, the aldehyde, and the acid from asarone, and anethoil, $OMe \cdot C_6H_4 \cdot C_2H_5$, anisic aldehyde, $OMe \cdot C_6H_4 \cdot CHO$, and anisic acid, $OMe \cdot C_6H_4 \cdot COOH$, on one side, and eugenyl methyl ether, $(OMe)_2 \cdot C_6H_3 \cdot C_2H_5$, vanilyl methyl ether, $(OMe)_2 \cdot C_6H_3 \cdot CHO$, and veratric or dimethylresorcinic acid, $(OMe)_2 \cdot C_6H_3 \cdot COOH$, on the other. The authors consider it a complicated task to determine the relative positions of the substituting groups. The acid and the trimethyl ether were treated with phosphorus pentachloride, hydriodic acid, and, lastly, with hydrochloric acid, but only in the last case was a satisfactory result obtained. The product crystallized from hot water in glistening needles, melting about 250°, decomposition and sublimation taking place at a much lower temperature. It dissolves in sulphuric acid, forming a blue,

and in nitric acid a green solution. With ferric chloride, the aqueous solution gives a black coloration, which in dilute solution becomes violet on adding a little sodium hydrogen carbonate. Its composition corresponds with the formula $C_{12}H_{18}O_4 = 2C_6H_8(OH)_2 - 2H_2O$, and it is to a certain degree analogous to phloroglucol.

TERPENES AND THEIR DERIVATIVES.¹

By J. W. BRÜHL.

A comparative study of the chemical and physical properties of the terpenes. A table containing the boiling point, rotation, density d , refractive index for the C line n , specific refraction $\frac{n^2 - 1}{(n^2 + 2)d}$ and molecular refraction $\frac{n^2 - 1}{n^2 + 2} \frac{P}{d}$ (P being the molecular weight), of a number of the best known terpenes, has been compiled from the data of different observers. The terpenes are thus divided into eight groups, similar to those given by Wallach (AM. JOUR. PHAR., 1887, p. 618,) phellandrene and terpinene coming under the heading laurene, and menthene and sesquiterpene forming an extra group. These groups are:

1. *Citrene* (limonene), boiling point $172-179^\circ$, the differences probably due to impurities in the specimens examined. Dextro-rotatory. Sp. gr. 0.846. Refractive index 1.47. Specific refraction 0.328. Absorbs 2 mols. HCl, the resulting product being identical with the similar product from dipentene, and giving the latter and not citrene when the hydrogen chloride is removed by means of aniline. From this, and the formation of a tetrabromide melting at 104° , the presence of two unsaturated or double bonds is probable, as also from the molecular refraction which agrees closely with that calculated for such an unsaturated compound.

2. *Dipentene*.—Differs from the above only in being optically inactive and yielding a tetrabromide melting at 124° .

3. *Isopentene*.—Dextrorotatory, differs only slightly from the two former in physical properties.

4. *Sylvestrene*.—Has probably never been prepared in a state of

¹ Berichte xxi, 145-179 and 457-477; reprinted from Jour. Chem. Soc., April, 1888, p. 377, and May, p. 494.

purity, and does not appear to differ in any marked degree from the foregoing.

5. *Pinene*.—Boiling point 155—160°. Sp. gr. 0.859. Refractive index 1.463. Specific refraction 0.320. The molecular refraction is that of a compound containing one double bond. This agrees with the chemical evidence, as pinene combines with 2 mols. of bromine and 1 mol. HCl.

6. *Laurene and Menthene*.—Boiling point 173—175°. Lævorotatory. Resembles pinene in other respects.

7. *Camphene*.—Solid, melting at 47°; boils at 156—157°. The hydrogen chloride derivative is very unstable and is decomposed by water at ordinary temperatures; it is therefore probable that this is only a molecular compound, camphene containing no double bond, a view supported by its optical properties.

8. *Sesquiterpene*, $C_{15}H_{24}$.—Found in volatile oils associated with the terpenes. Boiling point 250—260°. Rotation differs for different varieties. From its optical and chemical properties appears to contain two double bonds.

The author regards the terpenes as derivatives of paracymene. Formulæ similar to those of Wallach (*loc. cit.*) are proposed for citrene, dipentene, pinene, and phellandrene, and a discussion of the various possible formulæ for the other terpenes is entered into.

In continuation of the author's first paper the oxygen-derivatives of the terpenes are discussed. The physical properties of these are arranged in a table similar to that given in the case of the terpenes.

Menthol, $C_{10}H_{20}O$, is probably a derivative of menthene, with which it occurs in peppermint oil. It is lævorotatory, and its molecular refraction shows that it contains no double bond, and that its oxygen is united by single affinities. It is a secondary alcohol, and on oxidation yields the dextrorotatory menthone, $C_{10}H_{18}O$, a ketone, the relation of which to menthol is similar to that of camphor, $C_{10}H_{16}O$, to borneol, $C_{10}H_{18}O$. By the action of hydrogen chloride, menthol is converted into the compound $C_{10}H_{19}Cl$. This, by loss of HCl, yields hydromenthene, $C_{10}H_{18}$, from the tetrabromide of which, by the removal of 4 mol. HBr, paracymene is obtained. Menthol is probably hydroxyhexahydroparacymene [Pr : OH = 1 : 3].

Cineol, $C_{10}H_{18}O$, contains neither hydroxyl nor carbonyl, and yields; by loss of water, dipentene and also paracymene. It can form very

unstable additive compounds, but according to its molecular refraction is a saturated compound. It is optically inactive, and optically inactive dipentene dihydrochloride is formed when hydrogen chloride is passed into warm cineole. Of the nine possible formulæ for cineole as

a paracymene-derivative, only one, $\text{CPr} \begin{array}{c} \text{CH}_3 \cdot \text{CH}_2 \\ \diagdown \quad \diagup \\ \text{O} \\ \diagup \quad \diagdown \\ \text{CH}_3 \cdot \text{CH}_2 \end{array} \text{CMe}$, is in keeping with these facts.

Terpin, $\text{C}_{10}\text{H}_{20}\text{O}_2$, is an optically inactive compound, formed by the action of alcoholic nitric acid on pinene. It is a saturated compound, containing two hydroxyl-groups. By the action of hydrogen chloride on terpin, a compound, $\text{C}_{10}\text{H}_{18}\text{Cl}_2$, is formed, identical with the additive-product from dipentene and hydrogen chloride. Boiled with dilute mineral acids, terpin is first converted into terpineol, $\text{C}_{10}\text{H}_{18}\text{O}$, and then into dipentene. Terpineol contains one hydroxyl-group, has one double bond, and is optically active. In all probability terpin is a dihydroxy-, terpineol a monohydroxy-derivative of dipentene.

Camphor, $\text{C}_{10}\text{H}_{16}\text{O}$, is probably also a derivative of the terpenes and paracymene, as it is easily obtained from camphene. From the molecular refraction of ethylcamphor, it is concluded that camphor contains no double bond. Borneol, the secondary alcohol derived from camphor, is also a saturated compound. From bornyl chloride $\text{C}_{10}\text{H}_{17}\text{Cl}$, by elimination of HCl , camphene is obtained, so that borneol like camphor appears to be related to that terpene.

Isomeric with camphor are myristicol and absinthol. The first of these is an alcohol, and contains two double bonds. By the action of phosphorus chloride a compound $\text{C}_{10}\text{H}_{16}\text{Cl}$ is obtained, which on elimination of HCl yields paracymene. Myristicol is, therefore, probably a phenol of hydrated paracymene. Of absinthole but little is known; it is neither an aldehyde nor a ketone, but the oxygen is probably combined as in cineol.

Carvol and carvacrol, $\text{C}_{10}\text{H}_{14}\text{O}$. The molecular refraction is found to support Goldschmidt's views of the relation these substances bear to one another.

Safrol, $\text{C}_{10}\text{H}_{10}\text{O}$, contains according to the molecular refraction four double bonds, and from what is known of its chemical behavior has most probably the constitution $\text{C}_3\text{H}_5 \cdot \text{C}_6\text{H}_5 \cdot \text{O} > \text{CH}_2$. The recently discovered shikimol appears to be identical with safrol. Both are optically inactive.

CINCHONA CULTIVATION IN BOLIVIA.

By DR. H. H. RUSBY.

From a Lecture delivered at the Philadelphia College of Pharmacy December 1, 1887,
stenographically reported by Dr. C. H. Morgan.

At about the time that the plants exported to India had begun to produce seeds, the native supply of South America had become exhausted, and those whose business had thus failed were obliged to invest their capital in the planting and culture of the trees. So it happens that at the present time no bark, except an occasional bale, reaches the market, which is not the product of cultivated trees. All the barks I show you here, with about three exceptions, are the product of cultivated trees. I had men out for two months, searching the forests for wild trees, and so scarce is it that I assure you I succeeded in obtaining only three.

This brings me to the subject of its cultivation. Regarding the selection of a site for the plantation, I have already covered the subject in speaking of the conditions of its growth. After a suitable place has been selected the land must be cleared. This is done by felling the trees, and cutting away the undergrowth and burning it during the season of dryness, which occurs in quite different months, in localities even quite near to one another. The clearing process is not so difficult here as upon the level ground, owing to the ease with which the trees can be made to fall. It often happens that these trees in falling will carry down immense tracts of forest with them. The place where the trees are planted is very steep. On such a place I have seen a tree weighted down with water, go crashing down to a point so far below us, that to reach that point by the road it would occupy an entire day, whereas the tree reached the bottom in a single instant, carrying with it, not only all the trees and vines in its way, but immense masses of rock and earth, an avalanche of vegetation blocking up the stream below. These trees will contain a very great amount of water. You will readily understand this when I explain to you that you seldom see a portion of the trunk, or larger branches of the tree as large as the palm of my hand. It is so completely covered by parasites. Upon a single tree you may count sometimes from fifty to one hundred different species of plants growing as parasites, so that the trunk of a tree, which might be three feet in diameter, becomes five feet in diameter. The branches which themselves are about as thick as a man's leg, become so large with the mass of vines and mosses by which they are covered, that a person could very easily make his bed upon one of them, and sleep without danger of falling.

Among this vegetation you will see that a great deal of moisture could be held, and when one of these trees gets loaded down with the rain it often falls with its own weight. The burning process is never complete owing to the only partial degree of dryness which can be secured, and the labor is performed amid great dangers due to the steepness of the land. A level loamy spot is selected for the nursery and here the seeds are planted. When the plants have from three to seven leaves they are transplanted, the varieties being selected with great care. The ground between the rows is kept very clean, the weeding being performed twice annually. The planting is usually done by contract, the contractor agreeing to charge for none but valuable varieties brought to a certain age. The mode of counting the trees is as follows: com-

missioners, mutually appointed, walk between the rows of trees, plucking a leaf from each one, which leaves are carried to the house and counted during the evening, those of worthless varieties being rejected, the surface and venation of the leaf constituting the crucial mark. The trees are then carefully attended to until the bark matures. So freely has the pollen been transported from tree to tree, that however fine the tree may be from which you gather your seeds you will obtain from those seeds trees of almost every variety known to that section; so freely do they hybridize with one another. Similar trees of the same age, growing together may mature several years apart, the difference of maturity being indicated by the peculiar scaliness of the bark. The markings are very simple and can be readily observed when I pass around these two specimens. I ask you in passing them to take both of them in your hands at once, for the sake of comparison. You will see the large specimen which I hold in my left hand has not only longitudinal fissures, but transverse cracks, this dividing of the bark resembling the tarsus of a fowl, and hence called by the natives by a term which signifies "chicken-legs." This which I hold in my right hand, which is in every respect as good a variety of bark as the other is younger, and you will see that instead of cracking transversely it wrinkles longitudinally. This mark can be seen in a young tree of good variety, or it may indicate an old tree of a worthless variety; the difference being that the worthless variety, however old, still preserves its smooth character, while the good variety takes on this roughness.

While you are looking at these two specimens, more or less of the same quality, you may look at this specimen from an old tree, of a worthless variety, which is perfectly smooth, and of a light color. This is a spurious bark. An experienced hand goes through the plantation as a marker, and indicates the trees to be cut. The cutter follows, makes an incision through the bark about three inches above the root, and another one two feet higher, connecting them by a longitudinal incision. The bark is then removed in quills, which reduce very greatly in size and about sixty per cent. in weight, in drying. The sections of bark that I show you are four feet in length. The bark of commerce is about one half the length of this. We will take the two barks which I show you here, and you can all see the thickness of the first specimen. That specimen is still left upon the wood, so it has not shrunk in drying. If it had been removed from the wood, and allowed to dry in the quill form it would have contracted in size so much as to have been as small as that which I show you here, if not smaller. After this first quill of bark is taken from the tree, it is felled, and similar quills cut from above, the smaller portions being shaved. Two or three shoots are allowed to grow from the stump, and when these are cut five or six more may be allowed to grow for the next crop, after which the ground is replanted. The cutting is done by contract, the price paid being from fifteen to thirty-five cents for one hundred pounds of green bark. Arrived at the drying sheds, it is spread upon long narrow stretchers and exposed to the sun. In a week or ten days it is dry, and is tied with strips of raw-hide into bales of from sixty to sixty-five pounds each. This is the shape in which they are transported. Sixty-five pounds is a load for a man, and two of these bales is a load for a mule. Men however, usually carry them over the worst stages because mules are not able to endure the journey. At the repacking centre it is closely packed to go over the sum-

mit of the mountains. Men are rarely used upon this stage of the journey. The entire transit of these mountains requires about eight or ten days, and covers an actual distance of two hundred and twenty-five miles, costing from fifteen to twenty cents per pound Bolivian currency. So you see these men, loaded down as they are by sixty five pounds weight, accomplish for a period of ten days about twenty-two miles per day, and this is up and down mountains whose steepness surpasses anything which we have in this country. It is perhaps pertinent to remark just at this point that the Indians themselves believe it would be impossible to accomplish these journeys but for the use of coca. I must say that from my own experience I believe such to be the case.

From here it has nearly three hundred miles to go before it can be shipped. On this part of the journey there is comparatively level ground and three hundred pounds is a load for a mule, and five cents per pound the cost. The entire cost of collecting, drying, and transporting to London, the bark under the most favorable circumstances is estimated at about twenty-five cents per pound, United States currency, leaving the balance of fifteen to twenty cents of the ordinary selling price to go towards the expenses of cultivation. I can say too, that from my own estimate I do not see how people can buy bark from Bolivia, bring it to this country and get from it an amount of quinine which would not pay for the actual cost of the bark laid down in New York, leaving out of account the entire cost of manufacture. I do not see how they can get enough alkaloid from it to pay the cost of the bark itself. It has led me often to wonder whether it is not true that quinine is gradually being manufactured synthetically. I know nothing about it, but otherwise I am unable to explain the cheapness of quinine at the present time.

You are all aware that in India the custom prevails of taking bark from one side of the Cinchona tree, and then mossing. Mossing is, as you know, practiced to keep out the rays of the sun. The result is that new bark grows under the moss. This bark is not only greater in weight than the bark originally taken from that place, but it is very often much richer in alkaloid. This has been tried in Bolivia, and it has been found to be impossible on account of the great cost, owing to the comparatively high price of labor. The cultivation of Cinchona in this region is somewhat easier than in foreign lands. The product is slightly richer, but the expense is much greater than in India, the transportation charges not only eating up all the profits, but actually leaving a deficit on shipments disposed of at forced sale.

Cinchona trees were formerly met with two or three times the thickness of a man's body and tall in proportion. The age of such trees must have been very great, for wild trees at twelve or fifteen years are scarcely as thick as the wrist. Cultivated trees, on the contrary, at six to nine years, are six to eight inches in diameter, and yield from three to six pounds of bark. The appearance of a cinchona plantation is always handsome, owing to the peculiar satiny lustre of the leaves on many of the trees, of a rich purple red. When in flower its appearance is perfectly enchanting. At such times these groves are the resort of myriads of humming birds of which many species are to be found. I collected eight species of humming birds from a single tree in an hour's time. The air is at times filled with the hum of these birds just as it would be here with a swarm of bees. I collected altogether thirty-five species of humming birds.

The bark at present exported from Bolivia is almost wholly the *Cinchona Calisaya*, or yellow bark.

I pass on to say the yield from these barks is very variable. The pure *Calisaya* yields about eight per cent. of total alkaloids. The *cocola*, a spurious bark, gives only a small fraction of one per cent. Between these extremes you have every grade of excellence.

Besides the bark the natives use the leaves and flowers. The leaves are said to be nearly inert, but infusions of the flowers produce excellent results. They also use the buds, from which they make a gelatinous mass and apply it to fresh wounds, which heal up by first intention.

PHARMACOPŒIA OF THE PHILADELPHIA HOSPITAL.

In the February and March numbers of the *American Journal of Pharmacy*, 1876, we reprinted the formulas then in use in the Philadelphia Hospital. Since then many new preparations have been introduced, and others more or less modified, and a new edition of this hospital pharmacopœia was recently issued, which we reproduce in the following :

AQUÆ.

(Aromatic Diluents.)

Aqua Anethi.—Dill Water. B. P.
Aqua Capsici.—Capsicum Water.
Aqua Carui.—Caraway Water.
Aqua Pimentæ.—Allspice Water. B. P.

Emulsio Olei Gaultheriæ.

Each teaspoonful contains :
Oil of Wintergreen..... gtt. x.
Acacia..... q. s.
Water..... q. s. ad f3j.
Dose : One to four teaspoonfuls.

Emulsio Olei Morrhuzæ.

Each tablespoonful contains :
Cod Liver Oil..... f3ij.
Oil of Wintergreen..... gtt. i.
Oil of Peppermint..... gtt. i.
Acacia..... q. s.
Water..... q. s. ad f3iv.
Dose : Tablespoonful.

Emulsio Ol. Morrhuzæ et Hypophos.

Cod Liver Oil..... f3ij.
Oil of Sassafras..... gtt. ij.
Calcium Hypophosph..... gr. iij.
Sodium Hypophosph..... gr. iij.
Acacia..... q. s.
Water..... q. s. ad f3iv.
Dose : Tablespoonful.

Emulsio Ol. Morrhuzæ et Lactophos.

Each tablespoonful contains :
Cod Liver Oil..... f3ij.
Oil of Sassafras..... gtt. ij.
Acacia..... q. s.
Calcium Lactate..... gr. viij.
Acid Phosphoric (U. S. P., 50
per cent.)..... m. viij.
Water..... q. s. ad f3iv.
Dose : Tablespoonful.

Emulsio Ol. Morrhuzæ et Sod. Phos.

Each tablespoonful contains :
Cod Liver Oil..... f3ij.
Oil of Sassafras..... gtt. ij.
Acacia..... q. s.
Sodium Phosphate..... gr. viij.
Water..... q. s. ad f3iv.
Dose : Tablespoonful.

Emulsio Ol. Morrhuzæ et Pruni virg.

Each tablespoonful contains :
Cod Liver Oil..... f3ij.
Oil of Sassafras..... gtt. ij.
Fl. Ext. of Wild Cherry..... m. xxx.
Acacia..... q. s.
Water..... q. s. ad f3iv.
Dose : Tablespoonful.

Emulsio Ol. Morrhuzæ et Quassiaz.

Each tablespoonful contains
Cod Liver Oil..... f3ij.

Oil of Sassafras gtt. ij.
Tr. of Quassia m. x.
Tr. of Capsicum m. v.
Acacia q. s.
Water q. s. ad $f\overline{3}$ iv.
Dose: Tablespoonful.

Emulsio Olei Ricini.

Each tablespoonful contains:
Castor Oil $f\overline{3}$ ij.
Oil of Sassafras gtt. ij.
Acacia q. s.
Water q. s. ad $f\overline{3}$ iv.
Dose: One or more tablespoonfuls.

Glyceritum Acidi Gallici. U. S. P. 1870.

Glyceritum Acidi Tannici. U. S. P. 1870.

Glyceritum Ferri.

Tr. of Ferric Chloride m. cxx.
Glycerin q. s. $f\overline{3}$ j.

Glyceritum Iodi.

Compound Solution of Iodine.
Glycerin \overline{aa} . $f\overline{3}$ iv.
Epis. Hospital.

Glyceritum Olei Ricini.

Each tablespoonful contains:
Castor Oil,
Glycerin \overline{aa} . $f\overline{3}$ ii.
Oil of Cinnamon gtt. ij.
Dose: Tablespoonful.

Glyceritum Sodii Boratis. U. S. P. 1870

Linimentum Aconiti.

Tr. of Aconite $f\overline{3}$ vi.
Chloroform $f\overline{3}$ iv.
Spts. of Camphor $f\overline{3}$ iss.
Soap Liniment q. s. ad $f\overline{3}$ vj.
Long Island Hospital,

Linimentum Ammonia.

Ammonia Water (17.5 per cent.)
..... $f\overline{3}$ ij.
Oil of Flaxseed q. s. ad $f\overline{3}$ vj.

Linimentum Arnica Comp.

Tr. of Arnica
Green Soap Liniment.
Alcohol \overline{aa} . q. s. ad $f\overline{3}$ vj.

Linimentum Chloroformi Comp.

Chloroform $f\overline{3}$ i.
Tr. of Aconite,
Water of Ammonia \overline{aa} . $f\overline{3}$ ss.
Oil of Flaxseed q. s. ad $f\overline{3}$ vj.

Linimentum Olei Succini.

Oil of Amber $f\overline{3}$ j.
Oil of Olive q. s. ad $f\overline{3}$ vi.

Linimentum Saponis Viridis.

Spirits of Camphor $f\overline{3}$ ij.
Tr. of Green Soap $f\overline{3}$ ij.
Oil of Sassafras gtt. xxx.
Alcohol $f\overline{3}$ ij.
Water q. s. ad $f\overline{3}$ vj.

Linimentum Terebinthinæ.

Oil of Turpentine $f\overline{3}$ vj.
Tr. of Capsicum $f\overline{3}$ iv.
Oil of Flaxseed $f\overline{3}$ ij.
Lime water q. s. ad $f\overline{3}$ vj.

Linimentum Terebinth. Co.

Oil of Turpentine,
Water of Ammonia (17.5 per
cent.) \overline{aa} . $f\overline{3}$ j.
Soap Liniment q. s. ad $f\overline{3}$ vj.

Liquor Acidi Carbolic.

(1-60, 1-50, 1-40, 1-30, 1-20).

Liquor Acidi Borici.

Boric Acid gr. xvj.
Rose Water $f\overline{3}$ j.

Liquor Acidi Tannici.

Tannic Acid gr. xvj.
Distilled Water $f\overline{3}$ j.

Liquor Acidi Phosphorici Co.

Each teaspoonful contains:
Potassium Phosphate gr. iss.
Magnesium Phosphate gr. ij.
Calcium Phosphate gr. ij.
Phosphoric Acid (50 per
cent.) m. v.
Water q. s. ad $f\overline{3}$ j.
Dose: One to two teaspoonfuls.
Pepper.

Liquor Antisepticus.

Menthol gr. iij.
Thymol gr. viij.

Boric Acid.....	gr. xxx.
Sodium Benzoate.....	
Sodium Salicylate.....	āā gr. xlv.
Oil of Gaultheria.....	gtt. vj.
Oil of Eucalyptus.....	gtt. xviii.
Glycerin.....	fʒiv.
Alcohol.....	fʒij.
Water.....	q. s. ad fʒvj.

Use locally, well diluted with water

Liquor Cinchoninz.

Each teaspoonful contains:

Cinchonine Sulphate.....	gr. v.
Dil. Hydrochloric Acid.....	q. s.
Water.....	q. s. ad fʒj.

Dose: One to four teaspoonfuls.

Liquor Dobelli.

Sodium Bicarbonate.....	
Borax.....	āā. gr. xx.
Carbolic Acid.....	gtt. vj.
Tr. of Opium.....	fʒj.
Glycerin.....	fʒvj.
Water.....	q. s. ad fʒvi.

Dobell.

Liquor Hydrarg. Chlor. Corros.

(1-3000, 1-2000, 1-1500, 1-1200, 1-1000, 1-500.)

Liquor Potassii Permang., U.S. P. (1870).

Liquor Quinidinz.

Each teaspoonful contains:

Quinidine Sulphate.....	gr. ijss.
Dil. Hydrochloric Acid.....	q. s.
Water.....	q. s. ad fʒj.

Dose: One to four teaspoonfuls.

Liquor Zinci et Aluminis.

Sulphate of Zinc.....	
Powdered Alum.....	āā. gr. xij.
Water.....	fʒvj.

Episcopal Hospital.

Liquor Zinci Sulphidis.

Sulphurated Potassa.....	
Zinc Sulphate.....	āā. gr. xxiv.
Alcohol.....	fʒiv.
Rose Water.....	q. s. ad fʒvj.

Duhring.

Lotio Acidi Sulphurosi.

Sulphurous Acid.....	fʒiv.
Water.....	q. s. ad fʒij.

Roosevelt Hospital.

Lotio Calaminæ.

Calamine.....	ʒiv.
Zinc Oxide.....	ʒij.
Glyceria.....	fʒij.
Rose Water.....	q. s. ad fʒvi.

Tilbury Fox.

Lotio Cocculi Indici.

Fish Berries.....	ʒvj.
Diluted Alcohol.....	q. s. ad fʒvj.

Lotio Flava. B. P.

Lotio Nigra. B. P.

Lotio Pagliari.—Pagliari's Styptic.

Benzoin.....	gr. xxx.
Alum.....	ʒix.
Water.....	q. s. ad fʒvj.

Boil for 6 hours, replacing water lost by evaporation, and filter.

Pagliari.

Lotio Picis Alkalina.

Potass. Hydrate.....	ʒj.
Pine Tar.....	ʒij.
Distilled Water.....	q. s. ad fʒj.

Bulkeley.

Lotio Plumbi Subacet. et Opti.

Tincture of Opium.....	fʒijj.—fʒj.
Lead Water.....	q. s. ad fʒvj.—0j.

Lotio Rubra.

Zinc Sulphate.....	gr. xv.
Tr. of Lavand. Co.....	fʒiss.
Water.....	q. s. ad fʒvj.

N. Y. Hospital.

Lotio Sodæ Chloratæ.

Sol. of Chlorinated Soda.....	
Water.....	fʒijj.—fʒj.
Water.....	q. s. ad fʒvj.—0j.

Boston Hospital.

Lotio Sodæ Chlor. et. Opti.

Tincture of Opium.....	fʒijj.—fʒj.
Sol. of Chlorinated Soda.....	
Water.....	fʒvj.—fʒj.
Water.....	q. s. ad fʒvj.—0j.

Boston Hospital.

Lotio Sodii Hyposulph.

Sodium Hyposulphite.....	ʒiss.
Water.....	q. s. ad fʒvj.

Lotio Styptica.

Potassium Carbonate.....	3 iss.
Soap.....	3 iij.
Alcohol.....	q. s. ad f3vj.
	Pancoast.

Mistura Alterans Comp.

Each teaspoonful contains :	
Tr. of Prickly Ash.....	m. x.
Fl. Ext. of Lappa Minor.....	m. xv.
Fl. Ext. of Phytolacca.....	m. xv.
Fl. Ext. of Stillingia.....	m. xv.
Fl. Ext. of Sarsap. Co. q. s. ad	f3j.
Dose : Teaspoonful.	

Mistura Ammonii Carbonatis.

Each tablespoonful contains :	
Ammon. Carbonate.....	gr. x.
Mucilage of Acacia.....	f3j.
Oil of Sassafras.....	gtt. j.
Oil of Teaberry.....	gtt. j.
Peppermint Water.....	q. s. ad f3iv.
Dose : Tablespoonful.	

Mistura Anticolica.

Each teaspoonful contains :	
Tr. of Opium,	
Tr. of Rhubarb,	
Spts. of Peppermint,	
Spts. of Camphor,	
Spts. of Chloroform,	
Tr. of Capsicum.....	āā m. v.
Tr. of Catechu Comp.....	q. s. ad f3j.
Dose : Teaspoonful.	

Germantown Hospital.

Mistura Antifebrilis.

Each tablespoonful contains :	
Morphine Acetate.....	gr. $\frac{1}{2}$
Diluted Acetic Acid.....	m. v.
Tr. of Aconite.....	m. iss. (=gtt. iij.)
Spts. of Nitrous Ether.....	āā f3j.
Syrup of Lemon.....	āā f3j.
Sol. of Ammon. Acet.....	q. s. ad f3iv.
Dose : Tablespoonful.	

Mistura Aromatica.

Each tablespoonful contains :	
Coriander.....	
Angelica.....	āā gr. v.
Glycerin.....	m. xv.
Syrup of Orange.....	f3i.
Dil. Alcohol.....	q. s. ad f3iv.
Use : Flavoring vehicle.	

Mistura Arsenicalis Comp.

Each teaspoonful contains :	
Strychnine Sulphate.....	gr. $\frac{1}{2}$
Cinchonine Sulphate.....	gr. iiss.
Sol. of Arsenious Acid.....	m. iiss.
Tr. of Ferric Chloride.....	m. viiss.
Syrup.....	
Water.....	āā q. s. ad f3j.
Dose : One to two teaspoonfuls.	

Mistura Astringens.

Each tablespoonful contains :	
Tr. of Opium.....	m. viiss.
Ext. of Logwood.....	gr. x.
Aromat. Sulphur. Acid.....	m. v.
Cinnamon Water.....	
Syrup of Ginger.....	āā q. s. ad f3iv.
Dose : Tablespoonful.	

Mistura Bromida.

Each teaspoonful contains :	
Sodium Bromide.....	
Ammon. Bromide.....	āā gr. iiss.
Potassium Bromide.....	gr. v.
Syrup of Orange.....	m. xv.
Water.....	q. s. ad f3j.
Dose : One to four teaspoonfuls.	

Mistura Camphoræ.

Each tablespoonful contains :	
Deod. Tr. of Opium.....	m. v.
Nitrous Acid.....	m. iv.
Camphor Water.....	q. s. ad f3iv.
Dose : Tablespoonful.	Hope.

Mistura Chloroformi Comp.

Each teaspoonful contains :	
Chloroform.....	m. iiss. (=gtt. x.)
Tr. of Capsicum,	
Camph. Tr. of Opium,	
Comp. Tr. of Catechu.....	
.....	āā, q. s. ad f3j.
Dose : Teaspoonful.	Squibb.

Mistura Cretæ Comp.

Each tablespoonful contains :	
Tr. of Catechu.....	m. xxx.
Camph. Tr. of Opium.....	f3i.
Beechwood Creasote.....	gtt. i.
Chalk Mixture.....	q. s. ad f3iv.
Dose : Tablespoonful.	

Mistura Cubebe.

Two teaspoonfuls contain:
Oleoresin of Cubeb..... m. x.
Potassium Bromide..... gr. x.
Syrup of Acacia..... m. xlv.
Oil of Sassafras..... gtt. ss.
Water..... q. s. ad f3 ii.

Dose: Two teaspoonfuls.

J. Wm. White.

Mistura Diuretica.

Two teaspoonfuls contain:
Potassium Nitrate..... gr. v.
Potassium Acetate..... gr. x.
Spts. of Nitrous Ether..... m. xv.
Sol. of Ammon. Acet..... f3 i.
Syr. of Lemon..... q. s. ad f3 ii.

Dose: Two teaspoonfuls.

Germantown Hospital.

Mistura Emmenagoga.

Each tablespoonful contains:
Tr. of Cantharides..... m. v.
Tr. of Ferric Chloride..... m. x.
Tr. of Aloes..... m. xx.
Tr. of Gualac Ammon..... f3 j.
Syrup..... q. s. ad f3 iv.

Dose: Tablespoonful.

Deweese.

Mistura Expectorans.

Two teaspoonfuls contain:
Dil. Hydrocyanic Acid..... m. j.
Spts. of Chloroform..... m. v.
Hydrobromic Acid (34 per cent.)..... m. vijss.
Syr. of Senega..... m. xv.
Syr. of Squill..... m. xv.
Syr. of Wild Cherry q. s. ad f3 ij.

Dose: Two teaspoonfuls.

Mistura Ferri Aperiens.

Each tablespoonful contains:
Ferrous Sulphate..... gr. j.
Magnesium Sulphate..... gr. xlv.
Dil. Sulphuric Acid..... m. vijss.
Inf. of Quassia..... q. s. ad f3 iv.

Dose: Tablespoonful.

University Hospital.

Mistura Ferri et Ammonii Acetatis.

Each tablespoonful contains:
Tr. of Ferric Chloride..... m. x.
Diluted Acetic Acid..... m. xv.
Solution of Ammon. Acet. f3 ij
Elixir of Orange.....
Syrup..... aa q. s. ad f3 iv.

Dose: Tablespoonful. Bashman.

Mistura Ferri et Potassii Citratis.

Each tablespoonful contains:
Tr. of Ferric Chloride..... m. x.
Citric Acid..... gr. v.
Glycerin..... m. xxx.
Syrup..... f3 j.
Sol. of Pot. Cit..... q. s. ad f3 iv

Dose: Tablespoonful, diluted.

Mistura Ferri et Potassii Tartratis.

Two teaspoonfuls contain:
Tartrate of Iron and Potassium..... gr. v.
Glycerin.....
Syrup..... aa m. xxx.
Peppermint Water..... q. s. ad f3 ij

Dose: Two teaspoonfuls.

Mistura Ferri et Quininae Citratis.

Two teaspoonfuls contain:
Cirate of Iron and Quinine.. gr. v.
Syrup.....
Glycerin..... aa m. xxx.
Peppermint Water..... q. s. ad f3 ij.

Dose: Two teaspoonfuls.

Mistura Ferri Pyrophosphatis.

Two teaspoonfuls contain:
Iron Pyrophosphate..... gr. ijss.
Syrup.....
Glycerin..... aa m. xxx.
Peppermint Water..... q. s. ad f3 ij.

Does: Two to four teaspoonfuls.

Mistura Ferri et Quin. Phos.

Each tablespoonful contains:
Quinine Sulphate..... gr. ijss.
Diluted Phos. Acid..... q. s.
Iron Pyrophosphate..... gr. ijss.
Glycerin..... m. xxx.
Aromatic Mixture.....
Water..... aa q. s. ad f3 iv.

Dose: Tablespoonful.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, May 15th, 1888.

The eighth and last of the present series of Pharmaceutical Meetings was held to-day—Mr. Wallace Procter being asked to preside.

The minutes of the last meeting were read and approved.

Specimens of Sulphur from the Cove Creek sulphur-bed, in Beaver county, Utah, were presented to the Cabinet of the College by Harry C. Myers, of Cleveland, Ohio, who stated that some specimens of the mineral contained as much as 93 per cent. of pure sulphur. The sulphur is extracted by putting the ore into cylinders and passing steam into them, the slag being supported on a grating, which rests upon kettles receiving the melted sulphur, and from thence it is drawn off. The works have a capacity of over 3,000 tons per annum; so far, however, 1200 tons is the most yet attained in one year.

Mr. England called attention to a formula for a *tasteless extract of cascara sagrada*, made by exhausting the drug and treating it with magnesium carbonate. He stated that he had made experiments in the same direction, modifying the taste by means of alkalies, and found it made a very much handsomer syrup, that could be mixed with aqueous menstrua without precipitation, and withal was quite a beautiful preparation. But the fluid extract administered in four times the usual dose of a fluid extract made without the use of alkalies, was found to be inert. For this reason he called attention to the formula, to guard others from its employment. He said he thought that the value of cascara sagrada depended upon an acid principle, that promoted the peristaltic movement of the bowels, and thus was efficient as a cathartic.

Mr. England read a paper upon *Theine Hydrobromate Elixir*. The reading of the paper elicited considerable discussion about the salts of caffeine and theine. It was stated that several prices current quoted them as one and the same thing, and that orders for caffeine and caffeine citrate were supplied indiscriminately from the same stock. The paper was referred to the committee on publication.

Mr. Procter referred to the *Tincture of Strophanthus*. He made the tincture by treating 29 grams of the seeds, deprived of their awns, and after thoroughly bruising them, with stronger ether (100 grams being used; this was recovered by careful distillation); the seeds were then dried and percolated with alcohol, U. S. P., until 580 grams were obtained. The ether extracted 8.7 grams of dark fixed oil, which is possessed of some bitterness, but apparently does not contain much of the active principle. The tincture thus made cost \$1.35 per pound, the ether not being charged, as it is almost entirely recovered at a low temperature, and had little or none of the characteristics of the strophanthus.

Several inquiries were made, whether petroleum spirit would not be a better material to remove the fixed oil. Mr. Beringer's experience was that ether was not so good as the petroleum spirit, as there was more danger of removing alkaloidal matter by ether than by petroleum, as the fatty matter associated with the other ingredients in the plants rendered the active constituents more soluble than they would be if not so associated.

Mr. Moerk stated that Dragendorff, in his work upon plant analysis, laid great stress upon the use of petroleum spirit to remove fixed oily matters in operating upon plants.

The tincture of strophanthus is used for a heart tonic, being regarded as supe-

rior to digitalis, and does not possess the diuretic power that belongs to the latter drug; it was used in varying doses of from two to seven drops, and had been used in cholera in doses as great as twenty drops.

Mr. Beringer read a paper in which he discussed the propriety of introducing elixirs as a class into the pharmacopœia; showing that there was considerable demand for them and that the pharmacopœia should be the authority when a preparation or class of preparations became so important as to be one-twentieth of the prescriptions written. The paper induced a discussion as to the best method of preparing elixir of cinchona, whether from the bark itself or from a mixture of the associated alkaloids; the general opinion was that the elixir prepared from the alkaloids was preferable to that made from the bark. It was argued that as bark derived from East India was much used and sometimes gave the large yield of seven and a half per cent. of total alkaloids it was right that a higher grade of cinchona should be demanded by the pharmacopœia.

Mr. Beringer exhibited a sample of linseed oil, so called, but certain peculiarities made him suspect it and after saponification he found nearly fifty per cent. of mineral oil had been mixed in it.

There being no further business on motion adjourned.

T. S. WIEGAND, Registrar.

EDITORIAL DEPARTMENT.

REVISION OF THE U. S. PHARMACOPŒIA.—Within two years from the present time the convention for the revision of the pharmacopœia will meet in Washington, and it is expected that the medical and pharmaceutical societies interested in this work will then be able to present the results of their own deliberations in a manner to render it available for the Committee of Revision, which will be charged with the issuing of the next edition. A committee has been appointed by the Philadelphia College of Pharmacy for the preliminary revision of the work, and is now actively engaged in it.

The Committee of Revision and Publication appointed in 1880 has determined to compile from the literature which has appeared since the publication of the pharmacopœia in 1882, a report on all subjects likely to be of practical use in the preparation of the next pharmacopœia; also to collect reliable statistics regarding the frequency with which the various articles, recognized in the present pharmacopœia, are prescribed or legitimately used. It is more particularly in regard to the latter that the State Pharmaceutical Associations may be instrumental in collecting valuable material for the next revision. With this end in view, the committee has published an alphabetical list of all pharmacopœial titles, and copies of this list may be obtained from the chairman, Dr. Charles Rice, Bellevue Hospital, New York, for about \$6.75 per 100 copies. The plan proposed is that the State Associations collect such statistics for a definite period from different localities, through individuals or local associations, and that, from these reports, a general report for the entire State be compiled, and sent to the chairman of the Committee of Revision on or before January first next. If the State Associations act promptly in this matter, the next Committee of Revision will be able to intelligently decide which of the present pharmacopœial articles should be retained, and which should be dropped. It is obvious that in a similar manner statistics may also be collected of such drugs, preparations and chemicals which are not contained in the pharmacopœia, but are prescribed by physicians.

The subject of weights and measures, which has been so frequently discussed during the past twenty years, has evidently not been finally settled; it should receive the attention of each State Pharmaceutical Association, and the views

of its members, or of the majority of the same, should be clearly stated, so that the convention of 1890 may take proper action on this question.

The National Formulary which has been in preparation by a committee of the American Pharmaceutical Association, was completed during the past month, and the printing of it is about finished. It is now in the hands of the binder, and will be ready for distribution during the last week of June. It will be sent by mail to the members entitled to it, and will be for sale by the acting authorized agents in the different cities, and by the Permanent Secretary. The Publishing Committee have now under consideration the price at which it is to be sold, and which is to be as low as possible. Booksellers and wholesale druggists may likewise procure the book to supply their customers. The book will be bound in cloth, in cloth and interleaved, in cloth with raised nails, and in sheep.

Fire at the University of Pennsylvania.—At about eight o'clock in the morning of May 31st, fire was discovered in the building occupied by the medical department of the University of Pennsylvania, and although the firemen responded promptly to the alarm, considerable damage by fire and water was done to the building and to the various collections. The money value of the property destroyed is estimated to exceed \$50,000; but many of the specimens damaged or destroyed can never be replaced, or only gradually by the expenditure of much labor. The Stillé library containing about 3000 volumes of rare medical works, was considerably damaged. Dr. Henry F. Formad, in charge of the pathological laboratory, lost all his private collections, instruments, etc.; and Professors D. Hayes Agnew, Joseph Leidy and others had their private laboratories and cabinets more or less damaged or destroyed. The faculty of the Jefferson Medical College promptly expressed their sympathy, and offered the University the use of their museum and library.

OBITUARY.

Alfred Tatem died in Philadelphia on February 17th, in the 69th year of his age. He learned the drug business with the late Messrs. Jordan & Anderson at 3rd & Walnut sts., in 1838, and from that time until his death he was devoted to his profession. The deceased was for a short time with Mr. Charles Shivers, at 7th & Spruce sts. He established himself in business at 11th & Vine sts., where he remained until 1848 when he removed to 15th & Locust sts. During the last forty years his close attention to store duties, although detrimental to his health, enabled him to secure the confidence of a large patronage. His death was caused by pneumonia, after a sickness of only two days. Mr. Tatem was a member of this College and also having been elected to the Trade Association of Druggists.

Gustavus J. Luhn, a prominent pharmacist of Charleston, S. C., died in that city April 4th, 1888, in the 49th year of his age. He was born in Saxony, came to the United States in 1847, and in 1868 established himself in Charleston. He was one of the originators and a very efficient member of the South Carolina Pharmaceutical Association, and for a number of years served on the Pharmaceutical Examining Board of that state. In 1878-79 he was president of the American Pharmaceutical Association.

Hartwell Harrison Prichett, Ph. G., class 1886, was born in Greene county, Va., August 19, 1864, and died at the residence of his mother in Petersburg, Va., Feb 18, 1888. He was the son of a clergyman and received a good education. After serving an apprenticeship at the drug business he attended the Philadelphia College of Pharmacy in 1883-84. An injury to his left leg, received in childhood, now caused him much suffering and necessitated an operation by Professor Gross for necrosis of the bone. He returned to Philadelphia in 1885 and graduated with honor in the following spring.

J. Adam Weigner, Ph. G., class 1873, died at Lower Slatington, Pa., April 17, 1888, of consumption, at the age of 36 years. He was born near Bath, Pa., and since 1883 was in business at Slatington.

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Vol. 60

AMERICAN

JUL 6 1888 No 7

JOURNAL OF PHARMACY.

PUBLISHED BY AUTHORITY OF THE

PHILADELPHIA COLLEGE OF PHARMACY.

Under the supervision of the Publishing Committee, consisting of

HENRY N. RITTENHOUSE, JAMES T. SHINN, CHARLES BULLOCK, T. S. WIEGAND,

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CONTENTS.

On the Occurrence of Solid Hydrocarbons in Plants. By Hele C. DeS. Abbott and Henry Trimble	321
Malze Oil (Oil of Corn). By J. U. Lloyd	325
The Treatment and Distillation of Peppermint Plants. By Albert M. Todd	328
The Genus Luffa. By John M. Maisch	332
Notes on Some Old Remedies. By John M. Maisch	336
Reference Table of Doses. By Joseph W. England, Ph. G.	341
Abstracts from French Journals	344
Citrate of Iron and Strychnine	348
Keeping Qualities of Spiritus Aetheris Nitrosi, B. P. By John C. Hunter	349
Notes of Incompatibilities in Prescriptions. By H. Campbell.	351

Pepper and its Adulterants. By E. Davies, F. C. S., F. I. C.	354
Effects of Food Preservatives on the Action of Distaste. By Henry Leffmann and William Beam	356
The Detection of Saccharin in Beer. By A. H. Allen, F. C. S., F. I. C.	359
Note on Antipyretics. By Edward R. Squibb, M. D.	361
The Cardamom Plant	366
Jambul. By William Elborne, F. L. S.	368
American Pharmaceutical Association.	374
Pharmaceutical Colleges and Associations.	374
Editorial.	381
Reviews and Biographical Notices	383
Obituary.	320

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All communications relating to subscriptions, advertisements, etc., to the Business Editor, H. H. WOLLE, 143 North Tenth Street, Philadelphia, Pa.

Meetings of State Pharmaceutical Associations.

STATE.	TIME.	PLACE.	LOCAL SECRETARY.
Dakota, North,	Aug. 7,	Jamestown,	H. E. White.
Dakota, South,	Aug. 21,	Huron,	J. A. Keith, Lake Preston.
Georgia,	July 10,	Atlanta,	W. S. Marks.
Illinois,	Aug. 21,	Peoria,	L. C. Hogan, Englewood.
Maryland,	Sept. 19,	Baltimore,	M. L. Byers, Hagerstown.
Michigan,	Sept. 4,	Detroit,	Jas. Vernor.
New Hampshire,	Sept. 4,	Concord,	C. Spofford, Claremont.
North Carolina,	Aug. 8,	Goldsboro,	H. C. Shannon,
Wisconsin,	Aug. 6,	Palmyra,	C. Yates.

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SECTION ON SCIENTIFIC PAPERS.

"To Members of the American Pharmaceutical Association."

By vote of the Association at its last meeting, it was resolved that all papers for discussion in the section on Scientific Papers be printed previous to the September meeting, so that copies of them may be placed in the hands of the members present to facilitate the discussion.

In order that this may be done, papers should be in the hands of the Committee by the tenth day of August. They should be addressed to Dr. A. B. Lyons, Detroit, Michigan, Post Office Box 583. The earlier they are sent in, the better. Short practical papers are especially desired. Remember that in addition to the standing offer of the Ebert prize, there are to be awarded this year three special prizes, aggregating \$150, for the three best papers that shall be submitted at the September meeting.

T. ROBERTS BAKER,
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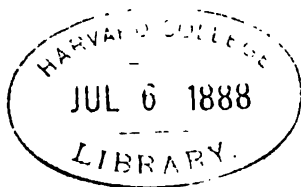
The 123rd ANNUAL WINTER SESSION will begin Monday, Oct. 1st, at 12 M. and continue 7 months.

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THE AMERICAN JOURNAL OF PHARMACY.

JULY, 1888.

ON THE OCCURRENCE OF SOLID HYDROCARBONS IN PLANTS.

A Contribution from the Chemical Laboratory of the Philadelphia College of
Pharmacy.

BY HELEN C. DE S. ABBOTT AND HENRY TRIMBLE.

When many plants of the higher botanical orders are exhausted with petroleum-ether, crystalline compounds may be separated from the extracts which have not been noticed previously to these investigations. These compounds are also obtained when alcohol or ether is used as a solvent; but it is preferable, on account of the greater number of constituents extracted by these menstrua, to employ petroleum-ether, and thus avoid certain difficulties of separation. Among the plants in which up to this time these compounds have been discovered may be mentioned: *Cascara amarga*, *Phlox Carolina* and the *Phlox* species, *Anthemis nobilis*, and in different species of the following natural orders: Rubiaceæ, Rhodoracæ, Eupatoriæ and other Compositæ.

The crystals from these petroleum-ether extracts first attracted attention in the winter of 1884. Samples of "chichipate" bark which yielded, on powdering, about two hundred grammes were then obtained and submitted to chemical examination. This bark was subsequently, from chemical analysis, identified as *Cascara amarga*.¹

Other investigations prevented the announcement of this work until some time later, under the title of "Preliminary Analysis of a Honduras Plant named 'Chichipate.'"² In this paper a new crystalline compound was described and identified by its physical and

¹ Jour. Franklin Inst., Vol. CXXIV, p. 1, Abbott.

² By Helen C. De S. Abbott. Amer. Assoc. Adv. of Science, Buffalo, Aug., 1886.

chemical properties as a "camphor-like body." Its analysis gave the following results :

I.	II.
C. 80.84	80.90
H. 10.13	10.11

A compound resembling the one from "chichipate" was also discovered later in *Phlox Carolina*,¹ and the account of it was read before a meeting of the American Pharmaceutical Association at Providence, R. I., September, 1886. The combustions of this camphor-like substance gave the following :

I.	II.
C. 82.49	82.57
H. 11.11	11.23

From subsequent study, we were led to believe that the above results were based upon a mixture of compounds. Because of the small amounts of crude material then at our disposal we were not able to overcome the difficulties inherent in purifying and separating these substances. However, from the preliminary investigations we were induced to think that these compounds presented features of unusual interest and novelty.

Recently we began anew our studies upon twenty-five and twenty kilos of *Cascara amarga*² and *Phlox Carolina* respectively.

The drugs were very thoroughly exhausted with a light petroleum-ether, boiling point under 45° C. The total solids extracted from *Cascara amarga* were 2.015 per cent.; of this about 0.1 per cent. were fats. The yield from *Phlox Carolina* was 1.00 per cent., including traces of coloring matter. On heating to 110° C., there was no appreciable loss of weight in *Cascara*. The *Phlox* contained small quantities of volatile oil.

The extracts on evaporating spontaneously deposited upon the sides of a dish or beaker glittering, white, feather-like crystals, often several centimetres in length. At the bottom of the glass were stellate groups of brilliant acicular crystals. Fats, wax, and in *Phlox* a red coloring matter, accompanied the crystalline principle, and rendered the subsequent purification tedious and difficult.

¹ On the underground portion of *Phlox Carolina*. By Henry Trimble, *Amer. Jour. Pharm.*, Vol. 58, p. 479.

² I am indebted to Parke, Davis & Co., Detroit, Michigan, for the generous supply of *Cascara amarga* received from them. Helen C. De S. Abbott.

The method finally adopted to purify, upon freeing the petroleum-ether residue from fats and coloring matter, was to treat the residue with boiling absolute alcohol, filter out the wax, which separated on cooling, and allow the filtrate to evaporate at the ordinary temperature. By fractional crystallization at least three substances of different and definite crystalline forms have been separated. We have, at present, examined only one of these constituent compounds; whether the others are the result of oxidation during the separating and purifying processes or exist as such in the plants, we are now unable to state.

The subject of our communication is the compound the least soluble in alcohol of the three obtained by fractionation. It formed silky, acicular crystals, often two to four centimetres in length, which, under polarized light, gave a play of colors. It also exhibited decidedly electrical properties. To determine the melting point, about 0.5 of a gram of the crystals were placed directly in the inner tube of an apparatus devised by Roth, for the determination of melting points. The substance melted at 196.2° C. to 196.4° C., leaving a clear, amber-colored mass. On heating to a higher temperature, the substance decomposed and vapor was driven off in dense clouds. It had an odor very like sandal wood; when condensed upon a cool surface, the sublimate consisted of fluffy crystals of a lower melting point.

The silky, acicular crystals were soluble in petroleum-ether, ethylic and acetic ethers, benzole, chloroform, hot alcohol, glacial acetic acid, acetic anhydride and linseed oil. The addition of water to the acetic anhydride reprecipitated the substance, in white, flakey masses. The crystals were insoluble in hot, cold or acidulated water, or in the alkalis or other hydrate solutions; insoluble in amyl alcohol and alcoholic soda. Nitric and sulphuric acids dissolved the crystals; sulphuric acid gave a reddish-brown coloration.

The first ultimate analyses of this purified product from *Cascara amara* gave the following results:

	I.	II.	III.
C.	86.30	86.29	86.33
H.	12.96	12.96	12.83
	<hr/>	<hr/>	<hr/>
	99.26	99.25	99.16

While the mean per centage obtained from these combustions indicated oxidation or the presence of adherent impurities, they also pointed strongly to the conclusion that the compound was a solid hydrocarbon.

The announcement of this discovery was reserved until it should be confirmed by further study. But a paper describing generally the occurrence of crystalline compounds rich in carbon was read, by title, last summer before the American Association for the Advancement of Science.¹ This inference has been put beyond doubt by the further study of the compound from *Cascara amarga* and *Phlox Carolina* during the past winter, obtained from an additional supply of these drugs.

Twenty-five kilos of *Cascara amarga* were extracted and the residue purified by often repeated fractional crystallizations, from which the following results were obtained:

0.1058 grms. gave 0.3413 C O ₂ and 0.1133 H ₂ O.	
0.1113 grms. gave 0.3588 C O ₂ and 0.1193 H ₂ O.	
I.	II.
C. 87.97	87.89
H. 11.89	11.90
<u>99.86</u>	<u>99.79</u>

From the plants mentioned at the beginning of this paper in which this crystalline principle exists, the *Phlox Carolina* was also selected as the one to confirm still further the presence and identity of this principle and its chemical composition.

Recently about 15 kilos of this drug were exhausted and the compound separated and repeatedly purified. Its ultimate analyses gave the following:

0.1117 grms. gave 0.3600 C O ₂ and 0.1208 H ₂ O.		
0.1314 grms. gave 0.4228 C O ₂ and 0.1421 H ₂ O.		
I.	II.	Theory for (C ₁₁ H ₁₈) _x
C. 87.90	87.76	88.00
H. 12.02	12.02	12.00
<u>99.92</u>	<u>99.78</u>	<u>100.00</u>

The above results indicate that this compound is an unsaturated hydrocarbon, and we intend to make it the subject of a thorough chemical investigation with a view of ascertaining its chemical constitution.

Whilst the discovery of the hydrocarbon resulted from independent investigations on different plants, we are agreed that the identity of the compounds justify us in publishing together these results of our studies. PHILADELPHIA, June 20th, 1888.

¹ By Helen C. De S. Abbott, New York, August, 1887.

MAIZE OIL (OIL OF CORN)¹.

By J. U. LLOYD.

It is well known that Indian corn contains considerable quantities of fixed oil, and some years ago endeavors were made to separate this oil from the ground corn before it was mashed in the making of whisky. The writer remembers that the late John Crawford, well known as a Cincinnati pharmacist, embarked in a venture with this object in view and some twelve years ago established a factory in Kentucky opposite the city of Cincinnati for the purpose of making bisulphide of carbon, which was used as solvent to remove the oil. The meal was percolated with this bisulphide of carbon, whereby the fixed oil was removed, and the bisulphide of carbon was afterward recovered by distillation.

It was thought by Mr. Crawford that the cornmeal so treated yielded a larger amount of whisky and of finer quality than when the crude meal was worked. However, after devoting some years to this industry and establishing the carbon process in several sections of the country in connection with distilleries, it was found, I think, that objections rendered it impracticable and that the advantages derived from the process were more than overcome by the disadvantages that followed. In consequence, if I remember correctly, even before Mr. Crawford's death, the schemes were dropped and the industries abandoned.

It has been found in the making of starch and perhaps in other directions as well, that it is desirable to get rid of the germs of the corn, as for reasons that it is unnecessary for me to mention, this germ is objectionable in these manipulations.

In order to accomplish the last result a machine has been devised that degerminizes the corn, throwing the hard starchy part of the corn in one direction and separating the germs in another, and this method can be, and is applied to the making of starch in large quantities and is found to be of great assistance and advantage.

Naturally, there was an accumulation of these excluded germs, which as is well known, constitute a considerable proportion of the corn, and they became a by-product. They were found to be valu-

¹ Read at the meeting of the Ohio Pharmaceutical Association, Columbus, June, 1888; contributed by the Author.

able as a feed for stock, but really were too "rich" for such purposes, containing as they did a large amount of oil, the oil of the corn being almost altogether found in the germ. In order to render this material more acceptable as a feed for stock a company was recently established for the purpose of squeezing the fixed oil from the germs and thus improving the feed meal. A plant was established a few months ago (the only one in existence now, I learn) in the city of Cincinnati for this purpose and is now in operation. The method is very simple. The germs are conveyed from the factories, wherein they are a by-product (such as starch factories), and are first purified by separating from them a considerable amount of bran or husk of corn that adheres to or is mixed with them. They are then steamed under pressure so as to soften them, after which in the usual manner, by means of hydraulic presses, the oil is squeezed from them.

The process is a very simple one and it yields an oil cake, which when ground into meal is found to be exceedingly valuable as a feed for stock, the manufacturers of this meal claiming that it is superior to corn meal that is made from the whole corn.

Thus it is that in addition to the oil cake, which is the prime object of the industry, there is an accumulation of the fixed oil of corn or maize oil, which induces this paper. I accidentally came across this oil, was led to its examination and as a result, found that it is in many respects preferable as I believe to cotton seed oil that has recently become officinal in the Pharmacopœia as a substitute for olive oil. I have used it in the making of ammonia liniment to which purpose it is particularly adapted, and in which, to my experience, cotton seed oil is practically a failure.

Oil of corn saponifies immediately, forming with ammonia a smooth creamy emulsion that retains its nature apparently indefinitely, as specimens that I have in my possession and which I herewith exhibit, are quite old and are now in their original condition. It does not clot and form masses or curd like aggregations, as we sometimes find to result with olive oil, in accordance with the manner in which ammonia is added to it, and even if for no other use than the making of ammonia liniment I think it should become officinal for that purpose instead of cotton seed oil. However, I doubt if there is any preparation in the Pharmacopœia that demands olive or cotton seed oil in which it cannot be used, and probably it will be found superior in all other

directions. Inasmuch as the industry that yields this oil in course of time promises to increase, and the oil to be obtained in unlimited amounts—indeed it can now be obtained in any quantity, car load lots or otherwise—it is not probable that the output will ever be less than the demand. It is peculiarly of necessity an American production and will always probably be at our command.

The price is reasonable now, in car loads being 40 cents per gallon; of course in smaller quantities, as it will be obtained by the retail druggists, there will be an increase probably reaching 60 cents, but even if the price should be equal to that of cotton seed oil or a little above it, so far as I am concerned, I say that it has proved in my hands enough superior to cotton seed oil for the making of volatile liniment (wherein I suggest its employment), to merit a better price.

Properties.—Maize oil has been analyzed by an English chemist, and the well-known authority, Prof. Chas. O. Curtman, M.D., of St. Louis, has determined its character as follows:

"Oil from embryo of Indian corn, in unrefined state, has a specific gravity of 0.916 at 15°C., which is nearly that of pure olive oil (0.915 to 0.918). The elaidin test shows the presence of a large quantity of olein, intermediate in quantity between olive and cotton seed oils. Its color is a pale yellow brown; its odor and taste that of freshly ground corn meal. It belongs to the non-drying group of the vegetable oils, experiments showing that a very thin layer on paper does not in three weeks' time form a pellicle on the surface exposed to air. In this respect it closely resembles the oils of olive, almond, colza, rape-seed, etc. It does not very rapidly become rancid by exposure to air, and in this regard compares favorably with the best oils. Its use produces no specific purgative effect any more than olive oil. With ammonia or solutions of caustic alkalies it rapidly saponifies, forming a white soap."

ANALYSIS BY F. WILLIAMS, LIVERPOOL, ENGLAND.

Fatty acids (free).....	0.88
Total fatty acids.....	96.70
Unsaponifiable, mucilaginous and albuminous bodies.....	1.34

The sample is a non-drying oil, and very easy of saponification. Being in a crude state, direct from the mill, I have subjected a portion of the oil to a process of purification or refining, finding the loss sustained to be a little over four per cent.

THE TREATMENT AND DISTILLATION OF PEPPERMINT PLANTS.¹

BY ALBERT M. TODD.

"It has been claimed that the herb peppermint, when freshly cut yields more oil than when dried. Is this so, and does the increased yield of oil compensate for the increased expense of shipping the fresh herb to the distiller?"

This question has long been a disputed one, and the discussions have attracted the interests of both scientists and manufacturers. That the importance of making a determination which would be satisfactory and final will be better understood, I will, before stating the results of my experiments, give a brief description of our novel industry, prefacing the description with the single remark that distillation is effected with three-fold the rapidity from the dry rather than from the green plants.

There are now, [in 1888],² cultivated annually in the United States [almost wholly in the states of Michigan and New York], over twenty thousand tons of peppermint plants, yielding over one hundred and twenty thousand pounds of essential oil, thus requiring on the average the production and handling of about three hundred and fifty pounds of plants in the undried state for a single pound of the essential oil. There are now in America, about two hundred and fifty small distilleries, where the crude or natural oil is produced, each distiller distilling, besides his own crop, the plants of about ten neighboring growers on the average, making the number of persons engaged in the industry as principals over two thousand five hundred, beside a large number of workmen employed in the cultivation and distillation.

The distillers' charge for working up the plants of other growers, has by custom been based upon the number of pounds of oil obtained rather than upon the quantity of plants, the present rate in

¹ Read before the New York State Pharmaceutical Association, June 1888; communicated by the Author.

²NOTE.—During the past few years the consumption of peppermint has rapidly increased, so that statistics of production and distilleries now given, show a marked increase over those given in my former papers on analogous subjects, which may be found as follows: in the "Proceedings of the American Pharmaceutical Association" for 1886, page 121, and the "American Druggist" for September 1886, page 161.

Michigan being twenty-five cents for each pound of essential oil. This custom is most satisfactory to the grower, as he pays only according to his receipts, but it will be seen that it is not equitable for the distiller unless the plants are well dried prior to distillation.

The manufacturing system may be briefly noticed as follows: the plants having been out when in full bloom, are drawn to the distilleries either with or without curing, according to the notion of the grower. The essential features of the distillery are, first, a large boiler for the generation of steam; second, a pair of large wooden vats, about six feet in height and of equal maximum diameter, which are connected with the boiler by steam-pipes, which enter them at the bottom, [two vats being used so that one may be emptied and refilled while the other is running]; third, a condensing apparatus, which consists of a series of pipes coated with pure tin, either with or without the ordinary "worm" over which cold water is made to flow continuously, this condensing apparatus being connected with the top of the distilling vats at pleasure by a duplex or "changing valve"; lastly, is the "receiver" in which the essential oil is collected, the ordinary form of which is a metallic vessel, about twelve inches in diameter and three feet in height, from the bottom of which an exterior pipe leads to a height nearly equal with the body of the receiver. Recently I have constructed a much more efficient and elaborate receiver for rapidly separating essential oils both heavier and lighter than water; but as this paper is not intended as a technical treatise on apparatus, it will not be described here.

About three inches from the bottom of the distilling vats are placed "false bottoms," containing many perforations, underneath which the steam enters from the boiler. Upon this perforated false bottom is placed a strong iron hoop, having a diameter nearly equal with the vat and supplied with heavy cross-bars. Two pairs of strong chains are secured to this hoop, meeting at the top of the vat in a pair of rings, one of which is fastened on either side of the vat at the top while it is being filled. This apparatus, as will be seen, is for the purpose of drawing the charge from the vats after distillation.

The apparatus being in position, the plants are thrown in by a workman with an ordinary hay-fork, while two or three others are engaged in "tramping them down." After the vat is about one-third full, a small supply of steam is let in, which softens the plants and greatly assists in packing. When filled, the vat is closed with a

steam-tight cover, and the other charge being now distilled, the entire amount of steam is turned on in the new one. The steam comes up through the perforations of the false bottom, and is diffused evenly through the plants. The oil is contained entirely in the minute cells of the leaves and blossoms. The action of the steam is two-fold; it softens the tissues of the cells and at the same time, by its heat, causes an expansion of the particles of oil, so that they burst forth from their miniature prisons, and are carried off with the current of steam. The steam, now charged with the essential oil, upon reaching the top escapes into the condensing apparatus, where it assumes the form of oil and water. Separation takes place in the receiver; the water, being heavier, sinks to the bottom, and is forced by the pressure from within, upward and out through the exterior pipe referred to. The oil collects on the top and is dipped off at pleasure.

As stated, distillation can be effected with three-fold the rapidity from the dry plants, for the effect of drying is to soften the plants, allowing a larger quantity to be used for a charge, while such large charge can also be distilled in one-half the time required for a smaller quantity of green plants. But many growers, fearing that a loss of oil results from drying, by diffusion in the atmosphere, cannot be prevailed upon to bring their plants to the distilleries other than in a green state. The extremes of difference I have noticed are as follows: From a charge of two thousand pounds of dry plants, well covered with leaves and blossoms, thoroughly dried, I have obtained twenty pounds of oil in thirty minutes, an hourly rate of forty pounds of oil and two tons of plants. From a similar charge of very coarse plants, with few leaves and blossoms, distilled in the green state, less than two pounds were obtained, requiring one hour for their distillation.

Upon a clear day in September, in the middle of the day, two loads of plants were cut down side by side at the same time. Both loads were immediately raked up in the green state, containing all the natural juices of the plant, then drawn to the scales and weighed. One load was immediately distilled, the other load being spread upon the ground and dried for two days in the sun. At this time the plants had become freed from nearly every particle of moisture, the leaves being so dry and brittle as to break off quite readily in handling. This second load, which had thus been dried in the sun and open air, was now spread out in a loft and exposed to a further drying and the action of the atmosphere for a little over six months.

The first charge of peppermint, which was distilled in the green state, weighed 2332 lbs. and produced 6 lbs. 9 oz. of essential oil, being one pound of oil for each 355.35 lbs. of plants, or 0.2814 per cent. After the second load had been dried and exposed to the atmospheric action as stated, for a little over six months, it was taken from the loft and distilled. I would say here that all the oil in the peppermint, as indeed in most, if not all, essential oil plants, is obtained from the leaves and blossoms. However, in distilling, the yield was more than one pound of essential oil for each 362.5 lbs. of original green plants, which slight loss (about two per cent. in the amount of essential oil), is certainly to be accounted for by the portion of leaves and blossoms which rattled off in the re-handlings. The charge of peppermint, which was thus fully dried, had shrunk 49.4 per cent. of its original weight.

It will thus be seen that although the plants are very aromatic both before and after cutting, there is no perceptible loss of the essential oil by a thorough drying of the plants prior to distillation, the oil being so tightly sealed in its little prison cells that a force greater than that existing in the atmosphere or the rays of the sun is necessary to free it. Indeed, I have noticed that the leaves which fall from the plants in dry seasons and remain upon the ground over winter, even though subjected to rains and snows as well, are often found months afterward to be so strong that one would hardly suppose that any of the strength had passed off. It is known though in practical experience that when the plants are once dried and subjected to rains, the water carries off a portion of the oil, acting in that respect as a slight distilling force.

It is not within the scope of the present article to treat of the chemical effect produced upon the oil by the action of the atmosphere, the tests of the oil, etc. Such determinations may be found by consulting the papers referred to in the note below. The principal results of the experiments recorded herein may be summarized as follows:

First.—In the treatment of peppermint and such other American essential oil plants as have been examined, no perceptible loss of the essential oil by diffusion in the atmosphere is occasioned by a thorough drying of the plants prior to distillation, in the open air at any ordinary temperatures.

Second.—When the drying of the plants is continued through many months, a slight oxidation of the oil in the leaf occurs through con-

tact with the oxygen in the atmosphere, decreasing its solubility, and increasing its specific gravity; also raising its boiling point through the formation of a non-volatile and insoluble resinoid produced by oxidation.

Third.—A long exposure of the plants to atmospheric action prior to distillation, does not affect the crystallizing tendency of the essential oil, nor other of its physical tests except those noted, so far as investigated.

Fourth.—To obtain the best results, both as to the quality of essential oil and economy of transportation and distillation, the plants should be dried as thoroughly as possible without endangering the loss of the leaves in handling. Distillation should then take place as soon as convenient, to prevent the oxidation of the oil in the leaf by atmospheric action.

NOTE.—Since writing the above, I just notice a paper by Mr. Joseph Schrenk, in the *American Druggist* for June, 1888, which corroborates the determination given in the above paper. Speaking of the crystals in the leaves of plants which have been dried for fifty years, he says: "It is remarkable how long these crystals will remain in the dried leaves. Fragments from an herbarium specimen gathered in Europe, in 1827, contain them in as perfect a condition as leaves of plants collected quite recently."

THE GENUS LUFFA.¹

BY JOHN M. MAISCH.

During the last six or eight years the so-called *towel-gourd* has attracted some attention, and the fibrous tissue of the fruit is now found in a number of pharmacies, where it is sold under the names of *vegetable sponge*, *luffa-sponge*, or *wash-rag*. The plant from which this article is derived is indigenous to Upper Egypt and other parts of tropical Eastern Africa, and belongs to the cucurbitaceous genus *Luffa* which is confined to the tropics, and is botanically closely related to *Momordica*, the genus yielding the well-known balsam-apple of our gardens; but, while the ripe fruit of the latter is dehiscent in an irregular manner, that of the *Luffa* separates at maturity an operculum

¹ Read before the Pennsylvania Pharmaceutical Association, at Titusville, June 13.

or lid, which is formed by a kind of disc upon which the floral organs were situated.

The plant is known as *Luffa ægyptiaca*, *Miller*, and formerly as *Momordica Luffa*, *Linneé*. It grows to the length of 20 or 30 feet, and has an angular tough stem which climbs by means of long and strong spirally twisted tendrils. The alternate leaves are roundish in outline, with a heart-shaped base, and with the margin divided into five lobes. The flowers are rather large, the corolla of a yellow color; the staminate flowers in racemes; the pistillate flowers solitary, with an elongated ovary and a three-lobed stigma. The fruit attains a length of from 10 to 20 inches, is two or three inches thick, elliptic in shape, but thinner towards the base; of a green color, externally marked by ten blackish longitudinal lines and opens at the apex by a flattish conical lid. The numerous seeds are oval, or oval-oblong, nearly half an inch in length and one-quarter inch broad; flat, slightly margined at both ends and of a dull blackish color. The testa is finely reticulate, and near the hilum on each side marked with two short ridges forming an obtuse angle. The embryo is of a greenish-white color and has an oily taste.

The part used is the net-work of fibres in the interior of the fruit. Strong fibrous bundles are found in the pericarp under each of the longitudinal black lines; similar bundles are also contained in the (normally) three placentas, which project from the pericarp toward the centre of the fruit, are there divided each into two branches and curve back again to near the pericarp. These longitudinal fibres, with their anastomosing branches following the same direction, are located in the inner layer of the net-work, while other branches running transversely form a similar outer layer, and in the placentas are arranged in strata, between which the numerous seeds are securely imbedded. To obtain this interwoven fibrous tissue, the ripe fruit is either kept in a warm and damp place for several weeks until the softer parenchyma becomes rotten, when it is removed together with its mucilaginous contents by repeated washing with water; or, without allowing the fruit to undergo this softening process, an incision is made longitudinally through the outer layer of the ripe pericarp, and the soft tissue with contents is removed by soaking in water, pressing with the hands and repeated washing, during which manipulation the seeds are likewise discharged through the longitudinal channels between the fibrous web.

When dry, this net-work is of a yellowish or dingy-white color, and rather hard and rough, though flexible; it readily absorbs moisture, becoming soft, though retaining its firmness, and in a slightly damp condition may easily be compressed. It is not unlikely that in this state it may be found useful as a surgical appliance for the absorption of liquid discharges, and bandages made of it have been employed to some extent in Europe. This absorbing power, combined with great durability and a certain amount of elasticity, have led, in Germany, to the manufacture of *luffa soles*, which are claimed to be more useful and serviceable in cases of sweating feet than soles made of felt or other material, by completely absorbing the perspiration and still retaining between the meshes a thin layer of air; moreover, they may be readily cleaned by washing with soap and water. The properties mentioned have also caused the material to be made into saddle undercloths which take up the perspiration of the sweating animal.

In Egypt, where the plant has long been cultivated, the *luffa* sponge is used for straining liquids, for scouring and scrubbing, and as a flesh-brush for friction in certain skin diseases; since its introduction into the United States it is employed mainly as a bathing sponge and as a flesh-brush, for which purposes it is well adapted in consequence of its lightness, texture, durability and the ease with which it is cleaned.

The plant is readily raised from seeds and is a rapid grower; if germinated early, it will flower and ripen its fruit in the latitude of Philadelphia before the cool autumn weather sets in, a light sandy soil being apparently better adapted for securing its perfection than a heavy and rich soil. Full-grown fruits, not completely maturing before cool weather, may be ripened by keeping them in a warm room; but in this case the fibrous net-work will be more delicate in texture and less resistant to wear. Being an annual of tropical origin, the plant will grow with little or no attention in the Southern States, where it is now raised to some extent as an arbor vine. But the vegetable sponge met with in our commerce is perhaps altogether imported from Europe, and, considering the low price at which it is sold here at retail, is probably of Egyptian, or at least Oriental, origin. It is imported uncut, or, in other words, in the same shape in which it exists in the fruit, and may be employed in this condition, more particularly as a bathing or washing sponge, since the outer

layer is smoother and softer than the inner layer, which is harder and rougher from the, both longitudinal and transverse, direction of the fibres, and from the projection of the placental tissues; hence the inner side is more effective for friction.

While the fruit in its pulpy portion has mainly a mucilaginous, not very inviting taste, it is to some extent used as a food by the poor people of Eastern Africa. The fruit of *Luffa Petola*, *Seringe*, is eaten in China and in some of the East India islands, and of the East India species Roxburgh mentions *Luffa pentandra* and *L. acutangula* of which the unripe fruit is edible. The last named species is more widely distributed than any other of the same genus, being indigenous not only to Southern Asia, as far northward as Afghanistan, but likewise to the West Indies and to South America as far as Brazil. In the West Indies it is commonly known as *strainer-vine*, very likely in allusion to the use made of the fibrous frame-work of the fruit. A variety of this, or a closely allied species, is *Luffa amara*, *Roxburgh*, which has also a cucumber-like fruit, about four inches in length and provided with ten sharp longitudinal ridges or angles. The entire plant has a very bitter taste, more particularly the leaves, which, according to Prof. Dymock, are used as an external application to sores in cattle. The fruit is cathartic and emetic, and in the form of powder is used as a snuff in jaundice, while the juice of the roasted young fruit is applied to the temples to cure headache.

Luffa Bindaal, *Roxburgh*, is regarded in Northern India as a powerful remedy in dropsy, and *Luffa echinata*, *Roxburgh*, is stated by Dymock to be employed in India as a remedy for colic, for cholera and for snake bite, the bitter fibrous contents of the fruit, which is of the size of a nutmeg, being given in substance or in the form of infusion.

Bentham and Hooker recognize ten species of the genus *Luffa*, of which only one is indigenous to America. However, in addition to *Luffa acutangula*, mentioned above, several other American plants are at least closely related to the same genus. For instance, *Momordica operculata*, *Linné*, is regarded by Grisebach as a variety of *Momordica Charantia*, *Linné*, and is *Luffa operculata*, *Cogniaux*, and of other botanists; in Brazil it is known as *buchinha*, the fruit being used for its powerful hydragogue cathartic properties. (See AMER. JOUR. PHAR., 1830, p. 144, 1884, p. 623.)

The fruit of the Egyptian luffa was chemically examined by R. J.

Weber (AMER. JOUR. PHAR., 1884, p. 7), who determined the presence of tannin, a little yellow coloring matter, a small quantity of bitter extractive, chlorophyll, and much bassorin-like mucilage. A chemical investigation of the bitter species of *Luffa* does not appear to have been made; but it is very likely that the bitter constituent represents the diuretic, cathartic and emetic properties, for which many plants of the order of *Cucurbitaceæ* are noted.

NOTES ON SOME OLD REMEDIES.¹

BY JOHN M. MAISCH.

It is well known that many remedies, being in the course of time replaced by others, fall into disuse, sometimes for a long period, until, through accident or from other causes, they again attract the attention of physicians and are released from obscurity, either to find an apparently permanent place among officinal drugs, or soon to be consigned again among the obsolete articles. Such reintroductions of old remedies are frequently heralded as new discoveries, and, in some cases, such a claim holds good for special therapeutic applications, or for the chemical and physiological investigation of the active constituents. In most cases it will be at least of interest, from time to time, to collect recent statements or observations on remedies which were used by our forefathers, and for this reason the following brief record of the recent use of more or less forgotten medicinal plants is made.

Potentilla canadensis, Linné, popularly known as cinquefoil, five-finger or dry strawberry, and common in grassy places throughout a great portion of North America, was employed over a hundred years ago as a vulnerary and as an astringent, in diarrhœa and hemorrhages, both internally and as a gargle. More recently it was lauded in chronic catarrhs, in gonorrhœa, and as a powerful sudorific (see AMER. JOUR. PHAR., 1875, p. 111); and during the past year (*Therap. Gaz.*, Aug., 1887), Dr. Sansom Pope, of South Carolina, stated it to be a reliable remedy for night-sweats, an infusion of the entire plant being taken *ad libitum*, and that it is in use among the negroes as a domestic remedy.

Capsella Bursa-pastoris, Moench, is known as shepherd's purse, and has established itself in most countries as a weed in fields and in waste

¹ Read before the Pennsylvania Pharmaceutical Association at Titusville, June 13.

and grassy places. For a long time it was employed, boiled in red wine, as a styptic in hemorrhages of various kinds, a use which has recently been revived in Europe. Formerly it also enjoyed some reputation as a remedy for gonorrhœa and for intermittent fever. Among its constituents are little volatile oil, identical with that of black mustard, a little bitter extractive, some resinous matter, and *bursic acid*, the latter having been recently prepared by Bombelon as an amorphous mass, which appears to be a glucoside. An interesting paper by Prof. Dr. Husemann, giving the medical history of this plant, has been published in *Pharmaceutische Zeitung*, 1888, p. 151.

Reseda luteola, Linné, called dyer's weed or weld, is a native of Europe, and occasionally found growing spontaneously in the Atlantic states of North America. Both the bitter herb and the pungent root, the latter having a raddish-like odor, were formerly valued for their diuretic and sudorific properties. A notice in *Journal de Médecine de Paris*, Feb. 5, 1888, states that reseda has a great reputation among the people of Russia as a tænicide, a strong infusion of the dried flowers being used, followed by a dose of castor oil. The species not being given, it is uncertain whether the indigenous (in Russia) species mentioned above is intended, or whether the notice refers to the flowers of the North African species, *Reseda odorata*, the well-known mignonette, which is cultivated every where for its sweet perfume, and was medicinally employed by the Romans (Plinius, lib. xxvii).

Ribes nigrum, Linné, the black currant of our gardens, is indigenous to Europe and Northern Asia. All parts of the shrub possess an unpleasant odor, and were formerly employed for their diuretic and sudorific properties, and were valued as an alexipharmic. While the fruit, owing to its repulsive odor, is not relished, its expressed juice, after being fermented and aromatized with nutmeg, cinnamon, and other spices, has a delicate odor and very pleasant taste. This liquor, which is known in France as *cassis*, contains about 22 per cent. of alcohol, and has recently been recommended by Ferd. Vigier (*Jour. de Méd. de Paris*, March 25, 1888, p. 520), as a vehicle for many unpleasant remedies: the following formulas will illustrate its uses:

Chlorhydro-pepsic Elixir. Dissolve pepsin 0.40 gm. (or gr. vi) in water 8 gm. (or ʒii) and hydrochloric acid 0.20 gm. (gtt. v); filter and add cassis 8 gm. (ʒij) and syrup 4 gm. (ʒi). Dose, a wineglass-full after each meal.

Elixir of terpin. Terpin 0.50 gm. (gr. vij ss); alcohol and glycerin, of each 6 gm. (ʒjss); cassia 8 gm. (ʒij); vanillin 0.005 gm. (ʒr gr.). Dose, a wine-glassful 3 or 4 times a day.

Wine of cinchona. Extract of cinchona 1 gm. (gr. xv), cassia 12 gm. (ʒiij); good wine 7 gm. Dose, a wine-glassful at each meal.

Cassia is also said to be well adapted for the preparation of elixirs of calumba, coca, chloral, etc.

Our indigenous black currant, *Ribes floridum*, *L'Heritier*, has the smell and flavor of the cultivated species, and while it is probably equally effective as the latter, its fruit could doubtless be used for making an aromatic wine similar to the French cassia.

Cytisus Laburnum, *Linné*, is indigenous to Southern Europe, and is cultivated as an ornamental shrub under the names of *golden chain* and *bean-trefoil*, the large pendulous racemes of golden-yellow flowers being very showy. The purgative and emetic properties of the leaves and seeds are known in Europe, and particularly the seeds have been to some extent employed in medicine. J. L. Prévost and Paul Binet have been studying, for some time, the physiological effects of the flowers, the green fruit and the seed (*Jour. de Méd. de Paris*, January, 1888, p. 48). The aqueous extract of the seed was found to be more effective than the alcoholic extract. They consider the drug to be a good emetic, acting rapidly and better by hypodermic injection than when administered internally; and state that in large doses, besides the emetic action, paralytic effects are produced closely resembling those following the use of curare.

Of medicinal plants not growing wild or under cultivation in the United States, the following may be mentioned as having attracted renewed attention recently:

Humiria floribunda, *Martius*, a tree indigenous to Brazil, yields a pale yellow balsamic exudation which is used there like copaiba, as a substitute for which it has been again suggested in Europe. *Humiria balsamifera*, *Aublet*, of Guiana, yields a reddish balsam and resin, with a storax-like odor, and employed like that balsam.

Acalypha indica, *Linné*, is used in India as an anthelmintic, a decoction of the leaves, to which a little garlic is added, being employed. The expressed juice of the plant, mixed with oil, has the reputation of being an excellent liniment in arthritic and syphilitic affections.

Acalypha betulina, *Retzius*. The leaves have an agreeable odor, and

are employed in dyspepsia and in cholera. Our indigenous species of *Acalypha* do not appear to have been used medicinally.

Syzygium Jambolanum, *DeCand.*, the jambolana or jambul of tropical countries, was referred to in a paper read before this Association in 1882, (Proceedings, p. 155, AM. JOUR. PHAR., 1882, p. 351). It was recently reported by Dr. J. Munday (*Brit. Med. Jour.*), to be of service in diabetes, in greatly reducing the quantity of urine, though it does not seem to affect the percentage of sugar secreted. One seed is taken thrice daily; the diminution of urine takes place within two days.

Schinus Molle, *Linné*, is a large tree of South America; its bark, leaves, fruit and exudation are medicinally employed. The fruit, which was recently sent to the London market on speculation (*Phar. Jour. and Trans.*, Dec. 3, 1887), is of the size of a pea and is remarkable for the striking resemblance in flavor to a mixture of pepper and fennel, and also has a slight bitterness and acidity. It has been used with success in gonorrhœa by Léotard (*Les nouv. Remèdes*, Nov. 27, 1887), and by E. Bertherand (*Jour. de Méd. de Paris*, March 4, 1888), and is given in the form of confection, the fruit being deprived of its reddish pericarp, then finely powdered and mixed with a small quantity of syrup of gum, whereby the odor and taste are sufficiently masked. The powder may also be made into pills. The tonic effects of the schinus fruit give it a great superiority to cubebs.

Hydrocotyle asiatica, *Linné*, the Indian pennywort, has been studied physiologically and therapeutically by Dr. C. Daruty de Grandpré (*Les nouv. Remèdes*, April 8, 1888). In small doses it acts as an energetic stimulant, its effects being chiefly directed to the cutaneous system; hence its usefulness in various skin diseases. In large doses it is narcotic, producing stupor, headache, and in some persons vertigo with a tendency to coma.

Gymnema sylvestre, *R. Brown*, a twining asclepiadaceous shrub, indigenous to India, is regarded there as a remedy against the poison of serpents. In a paper read before the Nilgherry Natural History Society, at Otacamund, David Hooper called attention to the curious property of the leaves upon the sense of taste. They are bitterish, astringent and acidulous. After chewing one or two of the leaves, the sweetness of sugar is not noticed, and quinine tastes like chalk. The effect seems to last for several hours, and is apparently due to *gymnemic acid*, which somewhat resembles chrysophanic acid. The taste of sour, saline and astringent substances is not materially altered.

Embelia Ribes, Burmann, belongs to the order Myrsinaceæ, and grows in Silhet where the berries have long been used for the adulteration of black pepper which they closely resemble in appearance, and to some extent in flavor. Dymock, in his work on the *Materia Medica* of India, states that they are efficacious against tapeworm, and form the principal ingredient of several patent medicines. G. H. Harris confirms (*The Lancet*) their efficacy for the complaint stated. The remedy is given, powdered, in doses of two to three drachms with milk or with curds early in the morning, fasting, and some hours later is followed with a purgative, like castor oil.

Siegesbeckia orientalis, Linné, order Compositæ, is widely distributed throughout Southern and Eastern Asia, where the bitter balsamic herb enjoys a reputation in dysuria and other complaints of the urinary organs. Dr. J. Hutchinson, of Glasgow, reports (*Brit. Med. Jour.*) his success in different forms of ringworm with the internal use of a syrup, prepared from the expressed juice of the plant; a liniment composed of equal parts of tincture of siegesbeckia and glycerin was employed externally. The drug appears to act both as a stimulant and parasiticide.

Several of the remedies enumerated above seem to deserve closer study on the part of pharmacists and physicians. Very few, if any, of them are likely to be honored in the future by a place in our national Pharmacopœia. Still, even this distinction may be supposed to be in waiting for a larger number, when it is remembered that in the last edition such previously discarded plants, like *Calendula* and *Chelidonium*, were again admitted.

The Haya Poison.—An arrow poison called Haya, has been examined for Messrs. Christy and Co., of London, by Dr. Lewin, of Berlin, and was found by him to consist of a substance identical with, or allied physiologically to erythrophlein, a substance which, he thinks, acts as a local anæsthetic. But Tweedy, in a letter to the *Lancet* (February 4th, 1888, p. 249), denies that erythrophlein produces anæsthesia, and Liebreich (*Deutsche Med. Wochenschrift*, Feb. 16, 1888) casts doubt on the inferences which Lewin has drawn from his experiments. He considers that Haya is probably a form of serpent poison, and hence, as Lewin found, acts more powerfully when injected subcutaneously than when taken by the mouth. The erythrophlœum bark found in the poison, Liebreich thinks, is probably simply an impurity. Lewin says that a paper which is about to appear in *Virchow's Archiv* will show many of Liebreich's objections to be groundless.—*Med. Chronicle*, March 1888.

REFERENCE TABLE OF DOSES.¹

BY JOSEPH W. ENGLAND, PH. G.

Without doubt one of the greatest needs in the coming revision of our national guide-book on Pharmacy—the U. S. Pharmacopœia—is the presence of a carefully constructed table of doses founded upon a general average of different authorities.

Authorities vary greatly in their statements of dosage. Indeed, it is almost impossible to find two who exactly agree in any large number of drugs, so that the physician and the pharmacist, on reference to them for information, are often exceedingly puzzled as to which of the conflicting and widely varying statements to accept.

Whilst this need is an undeniable one, the expediency of inserting doses in the Pharmacopœia is questioned. The main arguments urged are, that it would make the work authoritative in that direction, bring it into courts as evidence, and subject it to endless fault-finding; and the case of the British Pharmacopœia, which, in the last issue, inserted the dose with each drug, is cited as evidence in support of these assertions. The first claim is no argument at all. The great need for authoritative decisions on this subject is ample warrant for our Revision Committee to assume that responsibility, in addition to other equally responsible ones which they have assumed and discharged satisfactorily in the past. The argument that it would invite adverse criticism is fallacious, as is evidenced by the experiences of our Dispensatories, which, whilst they do not give tables, devote considerable space under each drug to statements concerning its dosage.

Relative to the insertion of doses in the British Pharmacopœia, the reason for their failure to meet popular approval seems much more probably resident in the method of dosage expression and lack of accuracy, than in the fact of their insertion, as may be evidenced by a critical examination of that work. For example, the dose of the officinal quinine salts is stated to be from 1 to 10 grains, whilst here tonic doses are 1–3–5 grains, and antipyretically used, 5–15, and even 30 grains is nothing unusual. Strychnine is stated to be from the $\frac{1}{16}$ th to the $\frac{1}{8}$ th of a grain, whilst the range is much more generally from the $\frac{1}{16}$ th to the $\frac{1}{4}$ th to the $\frac{1}{8}$ th of a grain; maximum, $\frac{1}{16}$ th to $\frac{1}{8}$ th of a grain.

¹Read before the Pennsylvania Pharmaceutical Association at Titusville, June 13.

Potassium bromide is given as from 5 to 30 grains, yet it ranges as a sedative, from 10-20-30 grains and, as a hypnotic, from 30 to 60 grains at a dose.

Potassium iodide is stated to be from 2 to 20 grains, while we use from 5-15-30 grains as an alterative, and 30-45-60 grains as an antisyphilitic.

Hydrobromic acid is given as from 15-50 minims, should be $\frac{1}{2}$ to 2 fluid drachms; maximum, 2 to 4 fluid drachms.

Hydrocyanic acid is made 3-8 minims (!) The range is 1 to 3 minims, maximum dose 3 to 5 minims.

Benzoic acid 10 to 15 grains. Our doses 10 to 15 to 30 grains.

Bismuth subnitrate is expressed as from 5-20 grains, should be from 10 to 30 to 60 grains.

Caffeine citrate as 2 to 10 grains. It is much more generally given in 1 to 3 grain doses, maximum 3 to 5 grains.

Cinchonine and *Cinchonidine salts* as 1 to 10 grains, should be 3 to 5-10 grains as tonic doses, and, antipyretically used, as 10-20-30 grains.

Lastly, under *Donovan's solution* we find the dose given as from 10 to 30 minims, which is equal to $\frac{1}{8}$ to $\frac{1}{4}$ of a grain, each, of arsenic and mercuric iodides (!)

These familiar examples amply suffice to show the general lack of accuracy, and most probably explain the reason of the British Pharmacopœia's failure of its dosage feature.

The German Pharmacopœia, in its "Table of Maximum Doses,"¹ is better, in some respects, than the British, but is not as good in others, while the Belgian Pharmacopœia seems to be the best of the three. The French Codex, with one or two exceptions, gives no doses. As a criticism of these works would follow largely in the same direction, it is omitted.

The point has also been raised, that if doses are inserted in the Pharmacopœia, that, being authoritative, it would make the dose of each drug so fixed and absolute that physicians could not venture beyond maximum limits without laying themselves open to serious questioning and criticisms, and possibly lawsuits.

Naturally, with this aspect of the case kept alone in view, physicians would most justly resent any limitation whatever in doses, whilst battling oft-times for life itself. But any possible contingency of this sort could readily be obviated by framing the dose table on a graded

¹National Dispensatory, 8rd edit., p. 1643.

scale, with the ordinary minimum, medium and maximum doses, and refusing absolutely to allow it to be considered as a fixed, inviolable standard, giving it, simply, as an expression of the *ordinary* quantity administrable at a single dose of certain drugs.

The accompanying alphabetically arranged table comprises a list of over 500 of the more important officinal and unofficinal pharmaceutical drugs and preparations, which have found employment in the wards of the Philadelphia Hospital, and is the table of reference there used by the Drug Department.

The doses are given in apothecaries measure, and are graded as minimum, medium, and medio-maximum doses, followed by (in the case of the more active remedies) the APPROXIMATE maximum limits; as the absolute quantity of a drug in a given case to effect a full physiological action, being varied by so many conditions on the part of the patient, can only be determined in each instance by the attending physician. The doses are those of adults. Those for an age of less than twenty four years and more than twelve years can readily be calculated by taking the number of the age as the numerator, twenty-four as the denominator and working out the value of the fraction. In cases of less than twelve years, Young's admirable rule of making the age the numerator, and the age plus twelve the denominator and working out the value of the fraction, is amply sufficient for all practical purposes.

The doses herein given are understood to be administered by the mouth. In administration hypodermically, the *general* rule is to make the dose three fourths that of the mouth dose, whilst, rectally, the method followed, is to make the dose one and one-fourth that of the mouth dose.

In all cases where the dose reaches maximum limits, the rule observed by us (unless the dose is especially marked or underscored, and even then where there is a too great frequency of dose,) is to have a personal interview with the physician, prior to compounding the prescription, so that he shall assume full responsibility. It is understood, of course, that where officinal preparations are named the standard of strength is that of our present Pharmacopœia. (U. S. P. 1880).

(To be concluded in the next number.)

Liniment of methylal is recommended to be made of methylal 15 parts and expressed almond oil, 85 parts.—*Amer. Jour. Med. Sci.*, April, 1888.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for THE AMERICAN JOURNAL OF PHARMACY.

RAPID PREPARATION OF MERCURIAL OINTMENT.—A quick and easy method is proposed by Jacquemaire, *J. de ph. et de chim.*, May 15, 1888, who uses in the process 1 part of potassium or sodium (the former preferred), to 1000 parts of mercury. There is no modification of the metal, and the lard is but slightly saponified. The mercury should be heated to dryness and the potassium added in small fragments while stirring; a slight crackling denotes the desired change and the mass is then poured into a mortar containing the lard, where it is rapidly beaten. The mercury becomes fully absorbed, even in large quantities, in about ten minutes.

A NEW OXYGEN COMPOUND FROM SULPHUR.—At a meeting of the Paris *Société de Pharmacie* (May 2), Mr. Villiers said that he had introduced sulphurous acid into a well closed phial containing crystals of hyposulphite of sodium and remarked 48 hours afterward that the acid had been absorbed. The operation was repeated until absorption ended. He then found that he had two salts, one of trithionate of sodium, and one of soda with a new acid. In the air the trithionate effloresced; the other crystals were gathered and recrystallized. This sodic salt is stable; the acid has not yet been isolated. *Arch. de phar.*, June 5, 1888.

SULPHATE OF ZINC—ITS DANGEROUS ACIDITY.—This salt—in common with other combinations of strong acids with weak bases—usually gives an acid reaction. It is very largely used in ophthalmology. A Belgian druggist barely escaped a suit some time since for having dispensed it knowing that it contained free acid. In fact, the processes of manufacture consist in saturating dilute sulphuric with zinc oxide or metallic zinc, and, after evaporation, to add acid, to prevent the formation of a basic salt. Professor Gille instructs his scholars in pharmacy to treat the compound as follows: Dissolve 50 cgm. of sulphate of zinc in 50 gm. of distilled water. Take a glass rod, wet with ammonia, and place it in contact with the surface of the solution. A clouded zone is produced by the hydrated zinc oxide which has been freed by the ammonia. Agitation of the solution causes a persistence of the cloudiness if the sulphate is pure; but the liquid becomes limpid if there is free acid present. The solution must be dilute, otherwise a soluble basic sulphate forms with the zinc

hydrate, and this might be a cause of error. When the quantity of free acid passes a certain limit the hydric sulphide loses the power of clouding the solution—a confirmation of the presence of free acid. The principle here applied may, with appropriate modifications, be made very useful in the laboratory for composites which, when pure, give acid or basic reactions.—*J. de Phar. d' Anvers; Bull. Comm.*, May, 1888.

NEUTRALIZATION OF POISONS.—At the sitting of May 12th, *Société de Biologie*, Mr. Roger communicated the results of experiments to discover if a mortal dose of a toxic substance is modified by the simultaneous introduction of another toxic substance. He used morphine, atropine, quinine and chloride of potassium. He first learned the “toxic equivalents” of each substance when injected hypodermically, and then used the bodies, two at a time. Mixtures of atropine and morphine caused death much sooner than the toxic equivalent of either. The same was the case with mixtures of atropine and quinine, and of quinine and morphine. In all cases the two substances acted synergically, and their toxic powers increased by exact progression. Mixtures of chloride of potassium and quinine had nearly twice the toxic energy indicated beforehand by their components. When the potassic salt is united to morphine each substance acts as if isolated, and the animal succumbs after receiving a mortal dose of either. Save in the latter instance the action of toxic substances when mixed two by two, is in accordance with the sum of their toxic power. In no case was there observed a toxic antagonism, that is to say, the more or less complete neutralization of one poison by another.—*Le Progrès méd.*, May 19th, 1888.

COMPARISON OF ANTIPYRINE AND ACETANILIDE WITH SOLANINE.—In a long and carefully prepared communication to the *Congrès d'Oran*, Dr. G. Sarda arrives at the following conclusions: The three medicaments are excellent nervines. Antipyrine is superior to the others in primitive or secondary, acute, articular rheumatism, migraine, recent neuralgias and paroxysmal pains. Antipyrine and acetanilide act in about the same way [*i. e.* they ameliorate. Trans.] in neuralgias of long standing and in motor excitation. Solanine is an excellent analgesic. Although inferior to the other two drugs in combating acute, articular rheumatism, it appears to be superior in old neuralgias. It calms gastric, ataxic and lancinating pains. It is an

excellent calnative for the phenomena of motor excitation—superior in this respect to acetanilide. It brings about a very rapid disappearance of the tremors of lamellated sclerosis, and controls exaggerated reflexes, and epileptoid trepidation. It appears to act with most certainty in cases of sensitive or motor phenomena dependent upon anatomical alterations. Judging from the cases cited by Dr. Sarda, an average amount to give per diem of acetanilide would be 2 gm.; and of antipyrine 3 gm. (he calls 4 gm. an elevated dose). The average quantity of solanine to be taken daily is distinctly stated to be 25 or 30 cgm. Toleration, he says, is perfect. *Bull. gén. de thérap.*, May 30, 1888.

MECO-NARCEINE.—At the *Acad. de Méd.*, May 29, Laborde stated in his own name, and that of Duquesnel, that they have obtained from morphine a pure, true, crystallized narceine, and an amorphous product wholly disconnected from morphine and the spasmodic alkaloids. Constantin Paul remarked that narceine exists only in minute quantities in opium, that it is almost inert, and that it does not become active except it be associated with other alkaloids of opium still undetermined.—*Le Prog. méd.*, June 2, 1888.

TARTRATE AND SALICYLATE OF QUINOLINE are recommended by Skraup (*Gior. di farm. sper.*), as being excellent for surgical dressings on account of their great antiseptic powers and easy solubility. The author says that the solutions are more active than those of zinc, silver or permanganate of potash. His formula for a gargle is: Quinoline, 1 gm.; alcohol, 90 per cent., 50 gm.; aqua menth., 500 gm.; ol. menth., gtt 2. An injection for blenorragia is as follows: Quinoline tartrat., 1 gm.; aq. dest., 150 gm.—*Nouv. Rem.*, May 24, 1888.

HELLEBOREIN AS A LOCAL ANÆSTHETIC. As a result of experiments with animals, Venturini and Gasparini conclude that greatly diluted solutions of helleborein induce complete corneal anæsthesia without irritations of any kind. The effect of a single application continued undiminished for half an hour; three light applications produced anæsthesia lasting for twenty-four hours; three or four drops of a solution containing $\frac{1}{2}$ mgm. to each drop, caused corneal anæsthesia in dogs to such a degree that perforation with pins was made within fifteen minutes and caused no expression of pain. It is to be noted that the authors refer to “a very energetic cardo-toxic action” as be-

ing one of the characteristics of this substance. *Nouv. Rem.*, May 24th, 1888.

STROPHANTHUS AS A DIURETIC. Dr. Lemoine stated to the *Société de Biologie*, May 26, that from clinical and experimental researches he had found strophanthus to be a powerful diuretic which, in elevated doses, would easily induce albuminuria. *Le Prog. méd.*, June 2, 1888.

OLEUM ROSÆ.—In a paper by Bonkowski Bey, the sultan's chemist, the percentage of the product obtained from a given number of roses is definitely stated. It has been hitherto considered a manufacturers' secret. The number of roses required for one ooque (1284 gm.) of distilled rose-water of good quality is given at 700. About 3000 kilogm. of roses are required to make one kilogm. of the oil. By hurrying the distillation, 1 kilogm. of oil may be had from 2,500 kilogm. of flowers, but the oil is not so fine as the first.—*Rev. méd. phar.*, Constantinople; *Arch. de phar.*, June 5, 1888.

BATJENTJOR, BATIATOR, OR VERNONIA NIGRITIANA.—Heckel and Schlagdenhauffen (*Compt. Rend.*; *Acad. Sci.*, May 14, 1888) describe the plant as indigenous in parts of Western Africa, where the root is sold as a febrifuge. Emetic properties are attributed to it, though the authors do not find emetine; indeed, they find no alkaloid in it, only a glucoside, which they name *vernoinin*, and which decomposes into glucose and a resin insoluble in water and weak acids. The glucoside appears as a slightly hygroscopic white powder, having a yellow tint in solution. It is slightly soluble in ether and chloroform; with sulphuric acid it turns brown, and then violet-purple. The resin gives the same coloration with sulphuric acid. Injected under the skin of the frog, in doses of "a few centigrammes," vernoinin arrests the movements of the heart. Its action may be compared to that of digitalis, but it is "twenty-four times less strong than digitalin."—*Arch. de phar.*, June 5, 1888.

MEDICINAL PLANTS OF ALGERIA.—At the Congress of the *Association Française pour l'avancement des Sciences*, Mr. Bertherand of Algiers mentions a number of plants which that province offers to the Pharmacopœia, among them the following: Arabian fraham (*Aceras anthropora*) gives good results as a sudorific and a stimulant. Arabian taubra (*Globularia Alypum*) is the usual purgative of the natives;

it is given in doses of from 20 to 25 gm. in decoction. Eucalyptus is well known by its prophylactic influence over intermittents. *Are-naria rubra* is used for gravel and vesical catarrh. Date shells are employed as an aliment and as a styptic in certain cases of atonic diarrhoea. Lantana is rich in essential oils and is used in sitz baths for the acute colics of dysmenorrhœa; also for anæmia. For muco-purulent, vaginal discharges it is used as an injection. Schinus Molle is used for making preparations for curing blenorragia. Finally, gazelle's musk is used as a substitute for that of the deer.—*Bulletin gén. de thérap.*, May 15, 1888.

CITRATE OF IRON AND STRYCHNINE.

BY DR. E. R. SQUIBB.

The Pharmacopœia of 1870, yielding to the popular demand for ready-made arbitrary combinations, introduced the citrate of iron and strychnine, and the present revision retained it, adding a very good paragraph of description and tests.

The preparation is a simple mixture of citrate of iron and ammonium with citrate of strychnine—or of an iron salt with a strychnine salt, without any known advantage, but with the rational disadvantage of a fixed relation between two agents which are rarely needed in the same proportion or for the same length of time in any two cases.

Its usage seems to depend upon its convenience to those physicians who prefer to have the proportions of their agents fixed for them beforehand. The original intention of the mixture was, doubtless, that it should be given in the solid condition, in powder, pill or capsule, but of late it has become common to give it in solution, and it is the object of this note to state that it is not permanent in solution.

When made in strict accordance with the U. S. P. process a whitish deposit will begin to settle out within two or three hours, and will continue to increase at the bottom of the solution during many days. A slight increase in the proportion of ammonia or of citrate of ammonia will retard the decomposition for a short time, and will redissolve the precipitate when formed, and in this way it may be made to stand about a day or two longer for each 2 per cent. of citrate of ammonia added to replace as much citrate of iron and ammonia, but no proportion tried has rendered the solutions permanent for a longer

time than three or four days when the proportion of strychnine is kept at 1 per cent. The precipitate in every case was about 50 per cent. strychnine, and any patient who should get the last doses from a vial that had not been well shaken at every dose, would be surely poisoned by the strychnine; not fatally of course, because if the precipitate was all strychnine and if all the strychnine was deposited, it would require 50 to 100 grains to yield a fatal dose. Yet the effects might be alarming and troublesome.—*Ephemeris*, III, page 1128.

THE KEEPING QUALITIES OF SPIRITUS ÆTHERIS NITROSI, B. P.

BY JOHN C. HUNTER.

From time to time, during the last two years, statements have appeared in the Journal as to the results of analyses of spiritus ætheris nitrosi by various experimenters, and have been generally to the effect that samples of that preparation, obtained from various wholesale houses, varied greatly in the amount of nitric oxide given off upon the decomposition of the nitrous ether in them, and further that samples which may have been of standard strength when first bought gave off upon testing them after several months had elapsed a less amount of nitric oxide, showing that the amount of nitrous ether in them had diminished.

Wishing to determine the amount of deterioration attending the ordinary routine of the retail sale of spirit of nitrous ether, I made half a gallon on March 10, 1887, and, on testing the product, found it to give off 7 vols. of nitric oxide at standard temperature and pressure. A portion was filled into the front shop bottle and the remainder tightly corked and put into a cool press away from the light.

On April 25, the contents of the shop bottle were tested and found to give off 5.6 vols. of nitric oxide. The stock bottle was tested at the same time, and found to give off 6.766 vols. of nitric oxide. On July 28, both bottles were again tested, when the shop bottle gave off 5.4 vols. nitric oxide and the stock bottle gave off 6.7 vols. The shop bottle at this time was refilled from the stock bottle. The latter was recorked and not opened again until Decem-

ber 28, when it was found to give off 6.12 vols. of nitric oxide. The shop bottle, being tested on the same date, was found to give off 3.8 vols.

On December 28, the shop bottle was filled up with the last of the half-gallon, and the preparation was finally tested on March 22, 1888, when it was almost sold out, there being only 2 ozs. left, and it was found to give off 3.4 vols. of nitric oxide.

From the foregoing results it appears that in the daily sale of spiritus ætheris nitrosi, B.P., there is a gradual loss of nitrous ether going on; but where the stock bottle is well stoppered and kept in a cool dark place, the decomposition of the nitrous ether is much slower than would appear from the statements of some experimenters; for beginning with spiritus ætheris nitrosi giving off 7 vols. of nitric oxide on March 10, 1887, it was found on December 28 to still yield 6.12 vols., which showed a loss of only 0.88 vol. in 10 months and 18 days.

Again, the preparation in the retail bottle gave off 3.4 vols. of nitric oxide on March 22, 1888; this showed a loss of 3.6 vols. of nitric oxide after it had been in daily use for 12 months and 12 days. From that may be deduced the fact that provided the dispensing chemist has his spiritus ætheris nitrosi, B.P., of standard strength to begin with, and does not keep it more than twelve months, it will never fall so low in nitrous ether as to give off only $\frac{1}{10}$ vol. to 1 vol. of nitric oxide, the quantity stated in some of the prosecution cases under the Sale of Food and Drugs Act.

In conclusion, every dispensing chemist, if he does not possess an Allen's nitrometer should test his spiritus ætheris nitrosi when bought from his wholesale house, if he does not make it himself, either by Mr. Proctor's method, as described in the *Pharmaceutical Journal*, (Feb. 19, 1887, p. 699), or by Mr. Blunt's syringe nitrometer (*Pharm. Jour.*, March 19, 1887, p. 763), for by so doing he could easily refuse to retain it if it did not give off 5 vols. of nitric oxide.—*Phar. Jour. and Trans.*, June 9, 1888, p. 1027.

Copaiba in Croup is recommended by Dr. P. H. Thompson, Bluffton, Ga. (*Med. and Surg. Rep.*), who uses a four ounce emulsion of copaiba 1 oz., containing also 1 oz. of syrup of squill. The dose is a teaspoonful every two hours, or less frequently, according to circumstances.

NOTES ON INCOMPATIBILITIES IN PRESCRIPTIONS.¹

BY H. CAMPBELL, Pharmaceutical Chemist.

The author said that some persons consider that all drugs which react chemically are incompatible, and, therefore, are led to condemn mixtures of tinct. hyoscyami with liquor potassæ, of liq. ferri perchlor. with glycerin, of quinine sulphate with alkalies, or of liq. plumbi subacet. with tinct. opii. But probably all present had dispensed such combinations to the entire satisfaction of the prescribers. In dealing, however, with presumably incompatible prescriptions, it was necessary, generally speaking, to rely on the following rules :

1st. If any dangerous decomposition may be expected to occur after the medicine has left the dispenser, some precaution should be taken to obviate such danger, and in most cases that precaution would take the form of a warning to the prescriber.

2d. To dilute the suspected ingredients before mixing, or, in the language of the dispensing counter, "to keep them apart as far as possible."

3d. To mix them cold.

4th. When strictly necessary, to use mucilage (preferably that of tragacanth) in order to retard decomposition, or to suspend a precipitate.

In a paper read before a medical society, the following mixture had been condemned on the ground that as the first two ingredients form a well-known alkaloidal precipitant, a compound containing most of the mercury will fall, and be taken in the last dose :—

R Liq. hyd. perchlor.....	℥ 10
Potass. iodid	gr. 10
Dec. cinchon.....	ad 3j

If, however, the mixture were dispensed according to the second rule, the precipitate was so readily diffusible and, after shaking, remained suspended so long, that the patient had plenty of time to pour out a dose ; but, of course, he should be directed to "shake the bottle."

Again it is considered that liq. strychnine must not be combined with sodium bicarbonate, yet the following mixture had remained clear for weeks :—

R Liq. strychnine.....	℥ 5
Sodii bicarb.....	gr. 15
Aq. ad.....	3j

¹ Abstract of a paper read before the Midland Counties Chemists' Association ; reprinted from *Phar. Jour. and Trans.*, May 12.

The dose of liq. strychninæ would contain $\frac{1}{2}$ grain of alkaloid, forming in the ounce mixture a solution of the strength of 1 in 9600, while the solubility of the alkaloid in water is about 1 in 5700.

Potassium iodide also was sometimes considered to be incompatible with strychnine. In a case where five grains of the former were prescribed in an ounce of water with doses of liquor strychninæ gradually increased from 5 minims to 30 minims, no precipitation occurred until more than 20 minims of the liquor were used, and even then, by adding one drachm of mucil. tragacanth to each dose, precipitation was so retarded that by only preparing sufficient medicine at a time to last one day the patient took it with safety. But in another case, where 10 grains of the iodide were mixed with 20 minims of the liq. strychninæ in an ounce of water, needle-like crystals appeared in twelve hours. This result was found to be due to the slight alkalinity (allowed by the British Pharmacopœia) of the iodide, for when the salt was slightly acidulated with acid hydrochlor., before adding the liq. strychninæ, no crystals appeared for four days, and then in comparatively small quantity.

Another favorite combination is:—

R Liq. hyd. perchlor.....	3j
Ammon. carb.	
Pot. iodid.....	āā gr. 5
Aq. ad	3j.

Although alkaline carbonates precipitate with mercuric chloride, still, if in the above mixture the first and third ingredients are mixed and the carbonate then added in solution, no precipitate occurs, even after a month has elapsed. If common water be used a slight precipitate of calcium carbonate forms, but it is free from mercury.

Tannic acid is said to be incompatible with mineral acids. It is true that a concentrated solution gives a white precipitate with acid. sulph. dil., and that as tannin is a glucoside it is decomposed by boiling with dilute acids, yet, dispensed according to the second and third rules, the following mixture showed no obvious signs of decomposition:—

R Acid. tannic.....	gr. 10
Ac. sulph. dil.....	℥ 15
Aq. ad	3j.

Tannin is considered incompatible with alkaloids, because in strong

solutions a dense precipitate occurs; but if the following be properly dispensed the precipitate is readily diffused on shaking:—

R Acid. tannici.....	gr. 5 (or 10)
Quin. sulph.....	gr. ij
Acid. sulph. dil.....	℥ 8
Aq. ad.....	℥j.

Potassium bromide is considered incompatible with metallic salts, and certainly it was not always safe to mix the liq. ferri perchlor. of the B.P., 1887, with the bromide, but the 1885 liquor, being practically neutral, forms in the following prescription a mixture in which very little bromine is liberated—generally none at all—for on shaking the liquid with chloroform the latter is scarcely colored, if at all:—

R Liq. ferri perchlor.....	℥ 15
Pot. brom.....	gr. 20
Aq. ad.....	℥j.

AmBr and NaBr give similar results, still it would be wise in this case to observe the first rule.

In other instances “incompatibility” can be overcome by adding something to the prescription. In a case where “ear-drops” were to contain cocaine hydrochlorate with borax, the alkaloid was partially precipitated, but immediately redissolved by a trace of hydrochloric acid.

When alkalies are mixed with quinine sulphate the alkaloid is liberated, often in a sticky resinous form, but if the powdered alkaloidal salt be mixed with water and a proper quantity of tragacanth mucilage, and the alkali be then added in solution, a presentable mixture results.

Syr. ferri iodidi gives with potass. iodid. a precipitate of ferrous quickly changing to ferric hydrate, because pot. iodid. is usually a little alkaline; but the addition of a little citric acid to the solution of the iodide will keep the mixture clear.

The author concluded by saying that when additions have to be made, the dispenser ought, if possible, to first obtain the sanction of the prescriber, and that in his experience such sanction had always been freely accorded; in fact, one very eminent London physician had said: “If I prescribe anything incompatible put the matter right for me, and drop me a postcard afterwards.” Such a habit of dependence upon the special knowledge of the pharmacist was, he had reason to believe, becoming more and more general among the members of the medical profession; it was for pharmacists to prove themselves worthy of it.

PEPPER AND ITS ADULTERANTS.¹

BY E. DAVIES, F. C. S., F. I. C.

Mr. Davies said the plant which yielded the pepper of commerce was one of the Piperaceæ, *Piper nigrum* being a climbing plant bearing its flowers in spikes. The flowers were unobtrusive, and were succeeded by green drupes which became red when ripe. They were gathered before ripening and dried, the fleshy portion becoming wrinkled and black. When white pepper was to be made the berries were soaked in water, sometimes, it was said, in cow's urine, and the outer layer rubbed off. Black pepper was manufactured by grinding the whole of the dried grain; white pepper, on the other hand, by grinding the decorticated berry. To meet the demand for an exceedingly light colored pepper, the outer layers of the seed were sometimes ground off, and only the nearly white kernel was used. As the starch of which the berry was largely composed was largest in proportion in the centre, the pepper so made was deficient in pungency and flavor, and it was a nice question whether such treatment was allowable under the Food and Drugs Act. Nothing was indeed added, but the removal of the most valuable portion of the berry was akin to skimming milk. One of the constituents of pepper was an essential oil, which could be obtained by distilling crushed pepper with water. Of this black pepper yielded 1.17 per cent., and white pepper 1.04 per cent., and it had the smell of pepper but not a strong taste. Its composition was akin to turpentine. The perfume of pepper being largely due to it, to obtain the best result the pepper should be fresh ground, or kept tightly closed. The custom of keeping pepper in castors with perforated tops was unscientific. Little mills by which the pepper could be ground when required was the best method of obtaining it pure and pungent. Other constituents were a resin soluble in caustic potash, and piperine, an alkaloid, the amount of which was very variable. In black pepper, from a recent analysis, the percentage was 7.14 to 6.62, and in white pepper, 6.47. It was soluble in alcohol, and was said to be febrifugal, it being curious that its composition was identical with that of morphine. Other ingredients were starch, which in black pepper amounted to from 49 to 56 per cent. and in white pepper from 77 to 85 per cent., and cellulose, which in white pepper ranged from 12 to 14 per cent. and in black pepper

¹ Abstract of a paper read before the Liverpool Chemists' Association; reprinted from *Pharm. Jour. and Trans.*, May 26.

from 21 to 26 per cent. Under the head of impurities, Mr. Davies dealt first with the mineral ingredients of the ash. In black pepper this was generally due to impurities adhering externally to the pepper seed, but except where sweepings had been added ought never to amount to more than 6 or 7 per cent. Of vegetable adulteration, the first to which he called attention was long pepper, made from the wild plant *Chavica Roxburghii*, which belonged to the same natural order as pepper, and also contained piperine, but in much smaller quantity. The essential oil yielded by it was stronger in smell, and there could be no doubt of the injury caused to pepper by the admixture of even a small quantity of this product. Rice was added to pepper for two reasons: first, to improve the color by whitening it, and so gratifying the taste for white pepper, and secondly, to increase the bulk with a cheap adulterant. Fortunately the angular starch grains of rice, being twice the diameter of pepper starch, rendered its detection easy. Spent ginger, which had also been used, was likewise easily detected for the same reason. They would be well acquainted with the history of the ingenious adulteration known as pepperette or poivrette. The discovery of it by Dr. Campbell-Brown, and the publication by him of a method for its detection, had stopped what might have been a very successful swindle. The great advantage of this adulterant was that it contained no starch granules, and the cells which composed it were almost identical in form with those of the cortical layers of pepper. Only by careful comparison of the two under ordinary polarized light could they be distinguished. The olive stones from which the adulterant was made possessed neither pungency nor flavor. Under the microscope the centre of the cells of bleached pepper was light colored, like the centre of the cells of the ground olive stone; but when polarized light was used there was a difference in color, the olive cells being light bluish, and the pepper yellowish.

Strychnine as a hypnotic is recommended by Dr. Lander Brunton (*Practitioner*, Jan. 1888.), in sleeplessness due to mental fatigue, caused by strain or worry, and is preferred to opium, chloral and bromides. Sleep comes readily to the tired, but not to those *over* tired, either with mental or bodily work. The stimulating effect of strychnine appears to convert the over tiredness which prevents sleep, into the simple tiredness which tends to it. Brunton has given 5—10 m. of tincture of nux vomica, or a granule or two containing $\frac{1}{10}$ gr. of strychnine, at bed time, the dose being repeated if the patient happen to wake within one or two hours.

EFFECTS OF FOOD-PRESERVATIVES ON THE ACTION OF DIASTASE.¹

BY HENRY LEFFMANN AND WILLIAM BEAM.

The use of antiseptics in perishable articles of food has become quite general in recent years, and has been, to a certain extent, the subject of legislation. Salicylic acid has been, probably, the most used, and while sanitary authorities of different countries have, as a rule, opposed its use, there has been no positive evidence of its injurious action, even when continued for some time. Lehmann published in Pettenkofer's "Archives of Hygiene" several instances in which healthy male adults had taken for many days considerable doses of this acid without apparent injury. While there may be a legitimate field for the use of the agents in articles of food of a highly perishable character, and especially where the addition is made known, there can be no question that their indiscriminate use is dangerous. Independently of any directly injurious action, it is important to inquire how far they may interfere with the nutritive or medicinal value of any article with which they may be associated. The matter has been brought prominently to our notice in consequence of some analyses made by us for the State Board of Health of Pennsylvania, in which the free use of salicylic acid in beers and malt extracts was detected. Similar results in regard to beers were found by other State Boards and the Department of Agriculture of the United States Government. It becomes important, then, to inquire how far the presence of these substances may interfere with the diastasic action ascribed to preparations of malt. It must be noted that with a number of the malt extracts now on the market the addition of a preservative has very little significance, because, as prepared, these articles are merely weak beers, and possess no diastasic power. Thus, of eleven samples tested, including all the extracts widely known in the market, only four had any appreciable effect, and but one of these was strikingly efficient.

We have undertaken a few experiments to determine what retarding effect the common food-preservatives may possess. The method of operating was that indicated by Drs. Duggan and Coale in papers in the *American Chemical Journal* and elsewhere, based on the estimation of the sugar formed in presence of a large excess of starch.

¹Read at meeting of Public Analysts, London, May, 1888; reprinted from the *The Analyst*, June, p. 108.

Arrow-root starch was selected for reasons given by these observers. To avoid error due to varying action of the dilute solutions of malt which are required for the experiments, a blank experiment was made in each set, and from this the diastasic value of the pure malt extract was determined. In the first observations maltine was employed, it having been shown by our previous tests to be far the most active of the commercial extracts, but later Schuchardt's diastase was used. The Fehling's solution was prepared as directed by Allen, and the determinations were made volumetrically. Many of the experiments were duplicated, with concordant results. In addition, a number of tests were made by the method given by Allen for valuing malt-extracts. The results obtained were similar to those given below, but, not being capable of quantitative comparison, are not detailed here.

The antiseptics selected were salicylic acid, boric acid, sodium acid sulphite, saccharin, beta-naphthol, and alcohol. The sample of beta-naphthol was of the form now sold under the name hydronaphthol. In all the experiments the temperature, time of action, strength of starch solution (30 grammes to litre) were the same.

In the following table the effect is represented produced by 0.5 cc. of maltine diluted to 5 cc., and added to 100 cc. of starch solution. The figures give the proportion of antiseptic used to the whole volume of solution, and the amount of sugar formed from the starch—that contained in the maltine being deducted:

Antiseptic used.	Proportion.	Fehling's Solution required.
None		245 cc.
Salicylic acid	1 to 500	No sugar formed.
" "	1 " 1,000	" " "
" "	1 " 20,000	245 cc.
Boric acid	1 " 1,000	245 "
Sodium acid sulphite	1 " 1,000	245 "
Saccharin	1 " 1,000	18.5 "
"	1 " 500	5.6 "
Beta-naphthol	1 " 1,000	204 "
" "	1 " 500	174 "
Alcohol	1 " 25	245 "

In the above experiments the antiseptics were added to the starch and the maltine allowed to act at once. In the following, very small quantities of salicylic acid and alcohol were first mixed with *maltine* and allowed to stand four days before addition to the starch.

Antiseptic used.	Proportion.	Fehling's Solution required.
None		245 cc.
Salicylic acid	1 to 20,000	174 "
Alcohol	1 " 500	221 "
Salicylic acid	1 " 20,000	174 "
Alcohol	1 " 500	

As before, the proportion of antiseptic is given to the whole volume of solution, after addition of the starch.

EXPERIMENTS WITH DIASTASE.

Proportion of Diastase.	Antiseptic.	Proportion of Antiseptic	Fehling's Solution required.
1 to 500	None		300.5 cc.
1 " 500	Salicylic acid	1 to 3,000	286 "
1 " 500	" "	1 " 1,500	18 "
1 " 500	" "	1 " 1,000	No sugar.
1 " 1,000	None		263 cc.
1 " 1,000	Salicylic acid	1 " 1,000	No sugar
1 " 2,000	None		283 cc.
1 " 2,000	Salicylic acid	1 " 5,000	82 "
1 " 2,000	" "	1 " 3,000	No sugar
1 " 1,000	Boric acid	1 " 1,000	250 cc.
1 " 1,000	Sodium acid sulphite	1 " 1,000	263 "
1 " 500	Saccharin	1 " 1,000	86.3 "
1 " 1,000	"	1 " 1,000	No sugar
1 " 1,000	Beta-naphthol	1 " 1,000	238 cc.
1 " 1,000	Alcohol	1 " 25	250 "

Saccharin was included in the above experiments on account of statements made recently in medical journals that it has decidedly antiseptic powers, and that it may be used liberally for internal administration. Such an opinion would be likely soon to lead to its use as far as its taste would permit.

The inferences from the above observations are that salicylic acid is especially objectionable in a malt extract, and that saccharin is also unsuitable. Alcohol in the extract is also objectionable. Beta-naphthol has some retarding action, but not very considerable. Boric acid and sodium acid sulphite seem to have but little retarding effect. Their effect, however, by long-continued action on the malt extract before adding it to the starch has not been tested. It is obvious that these conclusions apply to the use of preservatives in prepared articles of food.

With a view of adding further to this point, a sample of Fairchild's pancreatic extract was examined as to its action on starch, with and

without addition of salicylic acid. 0.3 grm. pancreatic extract in 100 cc. starch solution formed sugar equal to 161.3 Fehling's solution; in presence of one-thousandth part of salicylic acid, no sugar was formed.

The President said that the paper just read was a very important one in many respects, and he was glad to think that members of the Society so far distant as Philadelphia had made such a valuable contribution to the proceedings.

THE DETECTION OF SACCHARIN IN BEER.

BY A. H. ALLEN, F.C.S., F.I.C.

Clause 5 of the Customs and Inland Revenue Act has special reference to the use of saccharin as a sweetener and preservative of beer, and, in the discussion of the Bill in Committee, on April 27th, Sir Lyon Playfair, who was supported by Sir Henry Roscoe, contended that it was a mistake to prohibit the use of saccharin instead of sugar, as such a course would have serious deterrent results on a growing industry. He stated that foreign brewers were using saccharin largely, and that it could be manufactured in this country at a cost of 20s. to 30s. per pound. He concluded by asserting that the presence of saccharin in beer was very difficult to detect, and that there was another substance which, if employed in conjunction with saccharin, would absolutely prevent its detection, and therefore the result would be that if its use were not regulated the Excise would be defrauded. In consequence of the last statement I wrote to Sir Lyon Playfair asking what was the substance which would prevent the detection of saccharin if used in conjunction with it, and learned that the remark had applied to salicylic acid. Under these circumstances it is worth while to review shortly the analytical characters of saccharin.

Falberg's saccharin, we all know, is a coal-tar product, of which the systematic name is benzoyl-sulphonic-imide. It is the anhydride of ortho-sulphamidobenzoic acid, and forms a series of salts as sweet as, if not sweeter than, itself. The sweet taste of saccharin is variously stated at from 130 to 330 times that of cane sugar. As a matter of fact some saccharin tabloids, each of which was said to be equivalent in sweetening power to a lump of sugar, were found to have an average weight of 0.45 grain each, while an average lump of sugar weighed

about 90 grains. This relationship indicates that the saccharin has about 200 times the sweetening power of sugar.

When heated, saccharin partially sublimes, giving vapors of an intensely sweet taste. If heated in admixture with caustic soda to 250° C. it forms salicylic acid, which can be detected by dissolving the residue in acidulated water, agitating with ether, evaporating the ethereal solution of dryness, and adding ferric chloride, when the characteristic violet coloration is produced. When saccharin is ignited in admixture with caustic or carbonated alkali, preferably with addition of a little oxidizing agent, such as nitre, it yields a residue containing sulphate, which of course can be detected by adding chloride of barium to the acidulated solution. The weight of sulphate of barium precipitated, if multiplied by 0.785, gives the weight of saccharin to which it corresponds.

An aqueous solution of saccharin when heated with potassium ferri-cyanide becomes colored apple-green, an odor of hydrocyanic acid being evolved.

Saccharin is extracted with tolerable facility on agitating its acidulated aqueous solution with ether.

Utilizing these reactions I have found no difficulty in detecting less than $\frac{1}{2}$ grain of saccharin in one pint of beer. The beer was concentrated to about one-third, and at once agitated with ether. As a matter of fact, I added a little phosphoric acid, but this precaution was superfluous, as the liquid had already a marked acid reaction. Acidulation with sulphuric acid is not desirable. The ethereal solution left on evaporation is a residue which was, of course, intensely bitter and was not adapted for the recognition of saccharin by any test other than the production of sulphate on ignition in the presence of alkali. By this method, however, distinct evidence of the presence of saccharin was obtained, whereas a blank experiment on the same beer, to which no saccharin had been added, failed to show any trace of sulphates by the same process.

A purer residue is obtained by treating the beer with acetate of lead and filtering before agitating with ether. There is no occasion to remove the excess of lead, and in fact the use of sulphuretted hydrogen would be very undesirable.

It will be seen that the detection, and even the determination of saccharin in beer presents no great insurmountable difficulty, even in the presence of salicylic acid. I do not know of any organic sub-

stance containing sulphur, which would be likely to be used in or be present in beer, which would be extracted by ether from its acidulated solutions, and hence be likely to interfere with the above method of detecting saccharin. The Inland Revenue chemists have expressed the opinion that they would be able to recognize saccharin in beer by its taste. This might be so in the absence of hop-substitutes, but the presence of quassia would produce an ethereal extract of so intensely bitter a taste as wholly to mask the sweetness due to saccharin. At any rate, if the Inland Revenue chemists have devised any process by which the saccharin can be isolated from beer in all cases in such a state of purity as to be recognizable by the taste it is to be hoped that they will depart from their usual practice and communicate their knowledge to their brother chemists.—*The Analyst*, June 1888, p. 103.

NOTE ON ANTIPYRETICS.¹

BY EDWARD R. SQUIBB, M. D.

The word "antipyretic," although not new, has but recently come into common use as a substitute for the word "febrifuge." The words are synonymous and of the same ultimate derivation. Antipyretic is that which is opposed to fire, and fever comes from fire. Febrifuge is that which causes fever to fly, or to be fugitive. Hence the significance of both words is to oppose, counteract or dispel fever. The choice between the words seems to be a matter of taste or fashion, and febrifuge seems to be going out of use.

The oldest and best febrifuge is quinine, and this still stands at the head of the class of newer antipyretics. The origin and application of quinine are too well known to require notice here, and its value is too well established to be in much danger from the more modern agents. Until quite recently the great drawback to the use of quinine was its high cost, and almost all the recent antipyretics were discovered through the efforts of chemists either to make quinine artificially, or to make substitutes for it. The making of quinine synthetically or artificially, although several times announced, has not yet been accomplished; and its great abundance and low cost for the present, and probably also for the future, have taken away the incentive to make it synthetically, because if so made it could not be so

¹ Read before The Kings County Medical Association, Nov. 1, 1887; republished from *Ephemeris* III, p. 1063.

very much cheaper than from natural sources; and therefore it does not offer the inducement of the very large profits offered when the natural product was so costly. But the modern research in this direction has yielded very interesting and important results, in addition to the still increasing list of substitutes or antipyretics.

A brief notice of only the more prominent substances of this list is all that can be undertaken here, and all the material for this is compiled from a few of the numerous authorities on this subject. Nothing original is offered, and nothing as being very accurate, because every article of the list is put forth with the conflicting statements so apt to result from the combined influences of pecuniary interests, enthusiasm, and limited observation stimulated by the universal appetite for novelties.

Chinoline.—In 1842, Gerhardt, by distilling quinine with caustic potassa and water, discovered a base which he called quinoline, but the dearth of quinine forbade attempts to utilize the base from that source. By treating cinchonine in the same way he obtained another base which he named chinoline, and the comparative cheapness of cinchonine encouraged the investigation of chinoline and its salts. These were found to be active antipyretics, and the base was used through many years as a nucleus from which various chemical substances were built up of varying character and power as antipyretics or quinine substitutes.

In 1880, Dr. W. Königs, of Munich, gave a new impetus to the researches based upon chinoline, by making this in quantity synthetically or artificially from aniline. He was soon joined by Baeyer, Skraup, and others in a new order of investigations, which have been very fruitful, and are still in active progress.

The tartrate of chinoline was one of the earliest antipyretics, and was largely used. It is still in the markets, and still occasionally used, but has given place to more recent agents.

Resoin or Resorcin.—About 1862, Hlasiwetz and Barth, following up Gerhardt's idea of 1842, distilled certain resins with alkalis and water, and obtained a substance which they called resorcin, because it was obtained from resin and was similar to orcin from archil or orchil. Subsequently Körner prepared resorcin synthetically by building it up from a benzol nucleus, and from its constitution it is meta-dihydroxybenzol and belongs to the phenols.

Like salicylic acid it was first used and extolled as an antiseptic, and it was brought into prominence chiefly by Dr. Justus Andeer, of Wurzburg. Later, in 1880, Dr. Lichtheim, of Berne, showed that it was also an active antipyretic, with many effects analogous to salicylic acid, and for some time it was used quite largely.

Salicylic Acid.—Salicylic acid had been long known and many of its characteristics well studied, when in 1874 investigation into its therapeutic effects and use gradually led up to its antipyretic action now so well known, but with insufficient investigation it has had to give way to agents with newer claims.

Kairin, or Kairine, and Kairolin.—In 1882, the investigations of Drs. O. Fischer and W. Königs, of Munich, on the alkaloids, assumed that the characteristic properties of quinine were not based upon the chinoline nucleus, but by the introduction into this nucleus of an oxygen bearing or a hydrogen bearing element. A number of substances were prepared in following up this new departure, and these were submitted for physiological investigation to Dr. W. Filehne, of Erlangen. The net result of these joint labors was the production by Dr. Fischer of oxychinolinmethylhydride which was called kairine, and by Dr. Königs, of chinolinmethylhydride, which was named kairolin. The first of these soon after became the kairin of commerce, and having been patented, was extolled and advertised into a large usage. This seems to have been the first of the antipyretics that was started as such, and it was more largely used for a time than any of its predecessors; and it did more to introduce the fashion upon which its successors were to be still more largely used. It was the first one to be stimulated by the mercantile influence of a patent, and the patentees took good care that all that could be said in its favor should be widely advertised. Therefore it was very largely sold and used, and laid a good foundation for its successors, as its disadvantages were slowly recognized. The patentees are also the patentees of its immediate successor, antipyrin, and they are the well known enterprising color makers, Meister, Lucius and Brüning, of Hoechst, Germany. Each package of kairin is labelled as being protected by letters patent in Germany and the United States, and importation into France prohibited.

Antipyrin.—In the early part of 1884, Dr. L. Knorr, of Erlangen, synthetically prepared an oxygenated alkaloid which he called anti-

pyrin. This was investigated therapeutically by Prof. Filehne, who reported that it was an active antipyretic. For some months nothing was published in regard to the character or composition of this substance, but when it had been patented and introduced into commerce by the color makers above mentioned, Dr. Knorr published a paper stating that antipyrin was a derivative of an hypothetical base which he called chinizin, the systematic name being dimethyloxychinizin. Its antipyretic action was soon reported upon very favorably by many German observers of note, and it was made on a large scale and well advertised at a high price, but not so high as kairin. As it came into use the makers sought to patent it in other countries, and found no difficulty in extending the German patent to the United States. But in France there was difficulty. In the political economy of France, and to the great honor of the nation, it has long been held that the interests of suffering humanity are superior to the interests of inventors, and therefore, as a sanitary measure, patents upon medicines are not granted, and patented medicines from all sources are prohibited. The German patentees were part owners in a color-making company in France, and through this connection obtained a patent on the process for manufacturing dimethyloxychinizin as an aniline product. But as it was not used for any industrial purposes, and could not be sold as a patent medicine, the French patent could not be used; and as processes and articles patented in France but made elsewhere are absolutely prohibited, France seemed to be excluded from the use of antipyrin as well as kairin, unless it be admitted that any chemical manufacturer or pharmacist in France has the legal right to make and sell such articles when used only as medicines, without regard to the patent rights of other nations. This point is understood to be still unsettled, and every parcel of kairin and antipyrin bears on the label, "Importation into France prohibited on account of the French Patent Laws."

Thallin.—During 1884 a chinoline derivative was made by Dr. Skraup in this same search after quinine substitutes—which from yielding a very green color on reacting with ferric chloride and oxidizing agents was called thallin. The systematic chemical name of this base is tetrahydroparachinanisol, and the sulphate of this base is the salt commonly used as an antipyretic. Several of the salts of the base were investigated at the clinic of Prof. Nothnagel, and it is said to be very active in comparatively small doses. It is patented and

largely advertised, but in competition with other agents which have had these advantages, it has not come very largely into use. It appears to be a very active agent for reducing abnormal temperatures.

Antifebrin.—In 1853 Gerhardt discovered by a reaction between aniline and acetic acid a neutral body which was found to be phenyl-acetamide, or acetanilide. This substance was recently found to be an active antipyretic, and under the name antifebrin was, in 1886, very favorably reported by Prof. Kussmaul of Strassburg, as yielding very satisfactory results in comparison with antipyrin, whilst the cost is very much less, and the effective dose very much smaller. It is not patented, although the name, and perhaps a special quality under the name, is claimed as being proprietary. But it is also commonly sold now as acetanilide, of quite as good quality, and for but little over one-half the price it brings as antifebrin. That is, the two are identical except in price, and both are cheap.

Salol.—This combination of about 60 per cent. of salicylic acid and 40 per cent. of phenol or carbolic acid, was first produced by Prof. von Nencki, of Berne, and investigated by Dr. Sahli, also of Berne—the report of the latter upon the compound having been made in April, 1886. It was soon patented in Germany and the United States, and is now controlled by these patents. It is said to combine the properties and effects of its two constituents, and if so it is difficult to see why they should not be extemporaneously prescribed with the advantage of varying the proportion of the elements to meet the special requirements of varying cases.

Antithermin.—This is one of the two most recent additions to the long list of antipyretics. The systematic name given for it is phenylhydrazinlevulinic acid, and with such a constitution it is evidently nearly related to antipyrin.

Acetyl-amidophenol is the other of the two very recent antipyretics, and as yet this one does not appear to have received a common short name; and up to this time little appears to have been said in regard to these new agents.

No notice of prominent antipyretics should omit the mention of two of the oldest and best, although these may now be temporarily put aside for newer claimants to professional popularity. These two are *veratrum viride* and *aconite*.

In conclusion, it may be of interest to add a list of prices at which

these newer antipyretics are now sold by the wholesale druggists and to present specimens of each of them for inspection.

Sulphate of Quinine of the best makers at about.....	40c. per ounce.
Tartrate of Chinoline.....	70c. "
Resorcin.....	30c. "
Salicylic acid, patented.....	20c. "
Kairin, patented.....	\$2.00 "
Antipyrin, patented.....	1.25 "
Sulphate of Thallin, patented.....	1.75 "
Antifebrin, 30c. per ounce, or as Acetanilide.....	15c. "
Salol, patented.....	40c. "

THE CARDAMOM PLANT.¹

The cardamom of commerce, *Elettaria Cardamomum*, a member of the natural order of Zingiberaceæ, is indigenous to the forests of Malabar, where it is found growing wild at altitudes ranging from 1800 to 3500 feet above sea level. A moderate degree of shade and any amount of moisture are the climatal conditions most favorable for the plant's luxuriant growth.

If the shade be too profound, the stalks which spring from the rhizome will be but few in number, but if sunlight be moderately admitted they will increase amazingly, often exceeding seventy in number, but if exposed to sunshine for more than an hour or two daily, the plant languishes and eventually dies out. Each stalk throws out a scape, or peduncle, varying in length from 1½ to 2½ feet, on which the fruit is produced in the form of capsules, arranged in an alternate manner on each side of the shaft, at a distance of about 2½ inches from each other. From the description of the plant above given a large crop might be expected, but the result does not fulfill the expectation to the anticipated extent, as, owing to the large amount of moisture contained in the vegetable tissues of the cases which cover the grains, one pound of the green fruit reduces down to one quarter or sometimes one-fifth of a pound when fully dried.

¹ From the *South India Observer*. Reprinted from the *Phar. Jour. and Trans.*, June 9, 1888, p. 1032.

In its natural climate and soil, a sandy loam devoid of clay, the plant begins to bear in the second and yields a full crop in the fourth year. My experience does not enable me to state precisely the yield of each tree. I think that the planter may consider himself fortunate if he succeeds in harvesting on the average one-quarter pound of dry cardamoms per tree in the total number of sixty trees which occupy an acre, in the fourth year, less a certain percentage of loss occasioned by rats, squirrels and snakes, all of which species of vermin evince a partiality for the fruit and are ever on the watch to pounce upon it the moment it becomes ripe; and this entails the necessity of great watchfulness on the part of the planter to forestall these marauders, and be in the happy position of that early bird which proverbially "gets the worm." Each stalk, as it completes its functions in bringing its scape to maturity and becomes effete, is succeeded by another stalk, sprouting from the parent rhizome, which begins to bear in the course of a year; and in this order the growth proceeds with successive renovations, until the plant attains its ultimate span of existence, in the lapse of time; the extent or duration of which is not known to the writer.

Until Ceylon glutted the home markets, cardamom sold well, but they hardly fetch remunerative prices now, as the quotations have fallen from 5s. a lb. to 1s. 4d., and even less for the small kinds, of which there is a considerable proportion in all lots, and which sell for about 8d. per pound. The spontaneous way in which the plant was for a long time supposed to be exclusively produced, *viz.*, from the concussion of the ground occasioned by the fall of a large tree felled over it, was, if not a purely fanciful idea, probably a cunning one suggested by the interested motives of those who were the fortunate holders of the cardamom hills and habitats. Whether such an origin has any better foundation to rest upon than the mere imagination, it would be idle here to discuss as there is no question of the fact that cardamoms can be reared from seed sown in shaded nurseries in the ordinary way, or from the division of the rhizome into parts containing young shoots or eyes fit for development into them. The former is undoubtedly the quickest way of forming a plantation; although it must be admitted the seed is singularly slow in germinating, taking never less than three and often as many as five months before the little spikes show themselves above ground. Within a year from this time the plant will, with careful culture, have attained a sufficient

size to be planted out into pits dug for their reception in the shade of the forest, suitably prepared by trenching and the thorough extirpation of root and branch of the brush-wood occupying the surface. The process cardamoms are put through, called "bleaching," is a tedious one and, if left to agents, particularly costly. It is done by exposing them to the fumes of sulphur in closed receptacles, a process which has the effect of transforming their dingy grey into a delicate, pale straw color. This may be called one of the tricks of the trade, which, while perhaps it may not appreciably deteriorate or detract from the quality or flavor of the grains, captivates the public eye and secures a better price.

JAMBUL.

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The term "jambul," as now usually accepted, is understood to apply to the seeds of *Eugenia Jambolana*, Lam. (*Syzygium Jambolanum*, DC.), a tree attaining a height of from 70 to 80 feet, belonging to the natural order Myrtaceæ, and, like others of the genus *Eugenia*, is for the most part a native of tropical America, the West Indies and of the East. In India the bark, leaves and fruit of this tree are used in medicine; the seeds in the form of powder are at present being recommended in this country as a remedy in diabetes.

The bark when fresh is of a gray or pale brown color, with a somewhat fissured and scabrous surface. Its section is pale white, soft, brittle and full of starch-like granules. Its juice is rather sticky, with an acidulous and astringent taste and acidulous smell. According to Dymock, a description apparently applying to the bark in the dried state, "the bark is gray and fissured externally; internally it is red and fibrous; its minute structure is remarkable in having several rows of very large pitted oblong oval cells, which can easily be seen with the naked eye. The odor is like that of oak bark, and the taste very astringent." It is used in the preparation of astringent decoctions, gargles and washes.

The leaves differ from those of other myrtles in not being pellucid punctate; they are shortly petiolate, 3 or 4 inches long, smooth, leath-

ery, varying between oval and obovate oblong and between acuminate and very obtuse, the West Indian form being rounded at the apex. They have an aromatic odor and taste.

The fruit unless improved by cultivation is about the size and shape of an olive of a purple color and very astringent; within it is a thin white papery shell which encloses a large green kernel, also very astringent. The epidermis is smooth, shining and very thin, and can readily be removed by scratching; within it is the pulp of a dark reddish color. The seed when fresh is of a pinkish color, which becomes brown on drying. The rind of the fruit is said to contain the active principle (Year-Book of Pharmacy, 1886, p. 208). The powdered seeds are highly useful in diabetes (Khory's "Ind. Mat. Med.")

The jambul operated upon in the following notes was presented to the Materia Medica Museum of the Owens College last year by Mr. Thomas Christy, of London. It consisted of the dried kernels of the seeds, which had been cut in half transversely, apparently to facilitate the process of drying. The ovoid pieces were about the size of large peas, of a dull earthy-brown color with a dry earthy fracture, resembling in appearance fragments of pale catechu (*Uncaria Gambier*); odor slightly aromatic.

Moisture.—Ten grams reduced to a fine powder and exposed in a porcelain dish to the temperature of a water-bath until it ceased to lose weight lost 1.02 gr.=10.2 per cent.

Ash.—The dried residue from above, thoroughly incinerated in a platinum dish, left an ash weighing .25 gr.=2.5 per cent. upon the original substance.

I. Petroleum Ether Extract.—Twenty grams of the original substance reduced to fine powder was made up to 100 cc. with petroleum ether and macerated for forty-eight hours with frequent agitation. The clear liquid was poured off and the residue thrown upon a filter, and filtration continued by the addition of fresh ether until the filtrate measured 100 cc. The latter was of a yellowish-green color, and 20 cc. evaporated upon a water-bath until free from the solvent gave a residue of .015 gr.=37 per cent., consisting of chlorophyll and fat free from odor.

Experiments with other portions of the extract gave evidence of the presence of a mere trace of an exceedingly volatile oil, the odoriferous principle.

II. Ether Extract.—The seed residue from I., after being well washed with petroleum ether and dried by exposure to the air, was macerated with about 70 cc. of ether for forty-eight hours with frequent agitation. The clear liquid being poured off and the residue thrown upon a filter, filtration was continued with fresh ether until the filtrate measured 100 cc. of the latter, which was of a bright yellow color; 20 cc. upon evaporation left a dark colored resinous residue weighing 0.14 gr.=.4 per cent.

The ether residue is perfectly soluble in alcohol, and partially in water. Extracted with water, the aqueous filtrate develops a dark color with potash, is precipitated by acetate of lead, yields an inky mixture with ferric and ferrous salts, is not precipitated by solution of gelatin, and after having been boiled with a little dilute sulphuric acid copiously reduces alkaline copper solution, reactions indicating the presence of gallic acid.

Further experiments showed that water dissolved from the water-bath dried extract an amount equivalent to 0.1 per cent.

III. Alcohol Extract.—The seed residue from II., washed with ether and dried, was exhausted with absolute alcohol according to the above method, the finished product measuring 100 cc. Of the latter, 20 cc. evaporated to dryness yielded a brown residue of 0.035 gr.=0.8 per cent., which was perfectly soluble in water; the aqueous solution gave negative results with alkaloidal reagents, and towards others, results were obtained with lead acetate, ferric chloride, gelatin, and alkaline copper solution as in II., indicating the presence of the same body.

IV.—The seed residue from III., exhausted with water according to above method, and 20 cc. of the finished product evaporated to dryness on a water-bath weighed 0.19 gr.=4.7 per cent. The liquid extract was of a dark sherry color; 20 cc. mixed with twice the volume of absolute alcohol, set aside for twenty-four hours, filtered and the residue left in the filter washed with a mixture of alcohol and water (two vols. to one) weighed 0.05 gr.=1.25 per cent. of albuminous matters. The filtrate was evaporated until free from alcohol, and shaken twice with an equal volume of acetic ether. The ethereal layers being removed and the ether distilled off, left a colored residue weighing 0.03 gr.=0.75 per cent., consisting essentially of gallic acid.

According to the above, we arrive at the following proximate composition of jambul:—

Essential oil.....	a trace.
Chlorophyll and fat.....	0·37
Resin soluble in alcohol and ether.....	0·30
Gallic acid.....	1·65
Albumin.....	1·25
Colored extractive soluble in water.....	2·70
Moisture.....	10·00
Insoluble residue.....	88·73

100·00

I have to thank Mr. Harwood for services rendered in connection with this investigation.—*Phar. Journ. and Trans.*, May 5, 1888, p. 921.

PHARMACOPŒIA OF THE PHILADELPHIA HOSPITAL.

(Continued from page 317.)

Mistura Gentianæ Acidæ.

Each tablespoonful contains:
Dilute Nitrohydrochloric
Acid..... m. x.
Comp. Inf. of Gentian, q. s. ad f3 iv.
Dose: Tablespoonful.
University Hospital.

Mistura Magnesi et Hydrargyri.

Each tablespoonful contains:
Magnesia (heavy)..... 3i.
Blue Mass..... gr. v.
Powd. Acacia..... q. s.
Sp. of Ammon. Arom..... m. viijss.
Syrup of Orange..... f3 ij.
Peppermint Water..... q. s. ad f3 iv.
Dose: One or two tablespoonfuls, as
needed.

Mistura Magnesi et Rhei.

Each tablespoonful contains:
Comp. Rhubarb Powder.... 3ij.
Acacia..... q. s.
Lime Water.....
Peppermint Water aa q. s. ad f3 iv.
Dose: One tablespoonful.

Mistura Magnesi Comp.

Each wineglassful contains:
Magnesium Sulphate..... 3iv.
Fl. Ext. of Senna..... f3 jss.
Syrup..... f3 iv.

Anise Water..... f3 iv.
Water..... q. s. ad f3 ii
Dose: Wineglassful.

Mistura Pectoralis.

Two teaspoonfuls contain:
Ammonium Chloride..... gr. viijss.
Syrup of Senega..... m. xv.
Comp. Licorice Mixture q. s.
..... ad f3 ij.
Dose: Two teaspoonfuls.

Mistura Picis et Pruni Virg.

Each tablespoonful contains:
Pine Tar..... q. s.
Lime Water..... f3 iv.
Macerate the tar for three days in
the lime water, filter and percolate
through 30 grains of ground wild
cherry bark, adding sufficient lime
water to make the percolate measure
f3 iv.
Dose: Two to four teaspoonfuls.
Wood.

Mistura Rochelle.

Each wine glassful contains:
Rochelle Salt..... 3iv.
Syrup... .. f3 iv.
Peppermint Water..... f3 iv.
Water..... q. s. ad f3 ii.
Dose: Wineglassful.

Mistura Sodii Bicarb.

Each tablespoonful contains:
Sodium Bicarbonate..... gr. x.
Spir. of Ammon. Arom..... m. viiss.
Peppermint Water...q. s. ad f3 iv.
Dose : Tablespoonful.

Mistura Sodii Comp.

Each tablespoonful contains :
Sodium Bicarbonate..... gr. x.
Beachwood Creasote..... gtt. j.
Powd. Acacia..... q. s.
Syrup of Ginger..... m. xxx.
Tr. of Lavender Comp..... f3 j.
Lime Water..... q. s. ad f3 iv.
Dose : Tablespoonful.

Mistura Zollikofferi.

(Zollikoff's Mixture.)

Each tablespoonful contains :
Potassium Iodide.....
Guaiac..... ãs. gr. v.
Wine of Colchicum Root... m. xv.
Cinnamon Water.....
Syr. of Ginger..... ãs q. s. ad f3 iv.
Dose : Tablespoonful.

OLEA.

Oleum Carbolatum.

(1-40, 1-30, 1-20, 1-15).

Oleum Lini et Calcis.—Carron Oil.

Linseed Oil.....
Lime Water, equal parts.

PILULÆ.

Pilulæ Antineuralgicæ.

Each pill contains :
Arsenic..... gr. ʒj.
Strych. Sulph..... gr. ʒj.
Ext. of Belladonna..... gr. ʒj.
Cinchonine Sulphate..... gr. ij.
Vallet's Mass..... gr. ij.
Dose : One pill.

Pilulæ Antipyreticæ.

Each pill contains:
Powd. Opium..... gr. ʒ.
Powd. Digitalis..... gr. ss.
Quinine Sulphate..... gr. ij.
Dose : One pill every six hours.
Niemeyer.

Pilulæ Argenti et Opii.

Each pill contains:
Silver Nitrate..... gr. ʒ.
Opium Powd..... gr. j.
Dose : One to two pills.

Pilulæ Arsenicales.

Each pill contains :
Arsenious Acid.....gr. ʒv, ʒv or ʒv.
Dose : One pill.

Pilulæ Atropinæ.

Each pill contains :
Atropine Sulphate..... gr. ʒv or ʒv.
Dose : One pill.

Pilulæ Aperientes.

Each pill contains :
Ext. of Belladonna..... gr. ʒ.
Ext. of Nux Vomica..... gr. ʒ.
Ext. of Hyoscyamus..... gr. ss.
Sodium Bicarbonate..... gr. ʒ.
Ext. of Colocyn. Comp..... gr. i.
Ext. of Rhubarb..... gr. i.
Oil of Anise..... gtt. ʒ.
Dose : One to two pills.

Pilulæ Camphoræ et Opii.

Each pill contains :
Camphor..... gr. ij.
Powd. Opium..... gr. j.
Dose : One to two pills.

Pilulæ Cinchoninæ.

Each pill contains :
Cinchonine Sulphate, gr. j, ij, iij or v.
Dose : One or more pills.

Pilulæ Cinchoninæ Comp.

Each pill contains :
Ext. of Nux Vomica..... gr. ʒ.
Cinchonine Sulphate.....
Reduced Iron..... ãs gr. ij.
Dose : One pill.

Pilulæ Cinchoninæ et Arsenici.

Each pill contains :
Extract of Nux Vomica..... gr. ʒ.
Arsenious Acid..... gr. ʒj.
Cinchonine Sulphate.....
Reduced Iron..... ãs gr. ij.
Dose : One pill.

Pilulæ Colocynthis Comp.

Each pill contains:
Extract of Belladonna..... gr. $\frac{1}{2}$.
Resin of Podophyllum..... gr. $\frac{1}{2}$.
Ext. of Gentian..... gr. j.
Ext. of Colocynth Co..... gr. ij.
Oil of Caraway..... gtt. ss.
Dose: One pill at night, or
one night and morning.

Episcopal Hospital.

Pilulæ Ferri Carb.

Each pill contains:
Ferrous Sulphate.....
Potassium Carbonate..... $\bar{a}\bar{a}$ gr. ijss.
Dose: One to two pills.

Bland.

Pilulæ Ferri et Quassie Comp.

Each pill contains:
Ext. of Nux Vomica..... gr. $\frac{1}{2}$.
Ext. of Quassia..... gr. j.
Reduced Iron..... gr. j.
Powd. Soap..... gr. ss.
Dose: One to two pills.

Pilulæ Hepaticæ.

Each pill contains:
Ext. of Hyoscyamus..... gr. ss.
Ext. of Colocynth. Co..... gr. jss.
Blue Mass..... gr. ijss.
Dose: One to two pills.

Pilulæ Hydrarg. Chlor Cor.

Each pill contains:
Mercuric Chloride...gr. $\frac{1}{10}$, $\frac{1}{8}$, or $\frac{1}{4}$.
Dose: One pill.

Pilulæ Hydrarg. Iodid. Rub.

Each pill contains:
Mercuric Iodide..... gr. $\frac{1}{2}$ or $\frac{1}{4}$.
Dose: One pill.

Pilulæ Hydrarg. Iodid. Vir.

Each pill contains:
Mercurous Iodide.....gr. $\frac{1}{8}$, $\frac{1}{4}$, or $\frac{1}{2}$.
Dose: One pill.

Pilulæ Manganis Oxidi.

Each pill contains:
Manganese Oxide Prec..... gr. v.
Dose: One pill.

Pilulæ Plumbi et Opii.

Each pill contains:
Powd. Opium..... gr. ss.
Acetate of Lead..... gr. j.
Dose: One to three pills.

Pilulæ Podophyllini Comp.

Each pill contains:
Resin of Podophyllum..... gr. $\frac{1}{2}$.
Ext. of Colocynth. Co..... $\bar{a}\bar{a}$ gr. j.
Ext. of Hyoscyamus..... $\bar{a}\bar{a}$ gr. j.
Sodium Bicarb..... gr. $\frac{1}{2}$.
Oil of Anise..... gtt. $\frac{1}{2}$.
Dose: One pill.

Pilulæ Quinidinæ.

Each pill contains:
Quinidine Sulphate gr. j, ij, iij, or v.
Dose: One pill.

Pilulæ Rhei et Gentianæ.

Each pill contains:
Ext. of Hyoscyamus.....
Ext. of Gentian.....
Ext. of Rhubarb..... $\bar{a}\bar{a}$, gr. j.
Sodium Bicarb..... gr. $\frac{1}{2}$.
Dose: One pill.

Pilulæ Triplices.

Each pill contains:
Podophyllum Resin..... gr. $\frac{1}{2}$.
Blue Mass..... gr. j.
Aloes Purif..... gr. ij.
Dose: One pill.

Pilulæ Zinci Oxidi Comp.

Each pill contains:
Ext. of Belladonna..... gr. $\frac{1}{2}$.
Zinc Oxide..... gr. iij.
Dose: One pill at night.

PULVERES.

Pulveres Bismuthi.

Each powder contains:
Bismuth Subnitrate gr. 5, 10, 15 or 30.
Dose: One powder.

Pulveres Bismuthi Comp.

Each powder contains:
Bismuth Subnitrate..... gr. x.
Aromatic Powder..... gr. v.
Dose: One to three powders.

(To be continued in the next number.)

AMERICAN PHARMACEUTICAL ASSOCIATION.

The thirty-sixth annual meeting of the American Pharmaceutical Association, will be held in Detroit, Michigan, first session, Monday, September 8rd, at 8 P. M. Aside from the usual attractions presented by our meetings, préparations have been made for our reception by the pharmacists of Detroit, matters both scientific and recreative being elaborated to an unusual degree.

The Michigan Pharmaceutical Association holds its annual meeting simultaneously with our own, and it may safely be predicted that the members attending both Associations will outnumber any collection of pharmacists in the previous history of our country.

Full information regarding hotel and railway rates will be furnished our members, in the usual annual circular of the permanent secretary.

The Exhibition promises to equal if not surpass that of any preceding period in our history. Commercial interests are now recognized as a part of the object of our meetings, and it is to be presumed that extraordinary endeavors will be made to render conspicuous displays of commercial products. The local Secretary, Mr. James Verner, 235 Woodward Avenue, Detroit, will give information regarding matters connected therewith.

Dr. A. B. Lyons, P. O. Box 583, Detroit, Secretary of Committee on Scientific Papers, should receive the papers at as early a date as possible.

J. U. LLOYD,
President.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

The Massachusetts College of Pharmacy held its twentieth commencement at Association Hall, Boston, May 24th, when addresses were made by President H. Canning, Professor E. L. Patch and John H. Chute, Ph. G. The degree of Ph. G. was conferred upon the following :

Daniel Williams Adams, George Guy Bailey, Emory Franklin Bennett, Robert Henry Billings, Albert Edward Booth, Frank Tuttle Brackett, Wilfred Fletcher Brown, Nathan George Bubier, John Henry Chute, Walter Addison Clafin, William Corner, Charles Edgar Dotey, Llewellyn Frank Doyle, Everett Alexander Graves, George Walker Hastings, Ralph Creighton Hovey, Louis Jonas Hutchinson, Ernest Marshall Johnson, Marshall Ryder Johnson, Paul Constantine Klein, Franklin Haynes Martin, Alfonso Frederic Marsh, Frank Bowdoin Mathews, Charles Milan Morse, Frank Boyden Morse, George Frederick Moulton, Clifford Ramsdell, Winslow Hudson Rogers, George Herbert Rose, John Albert Schumacher, Nat Vaughan Shannon, Charles Augustus Siegmund, James Augustus Slattery, Charles Franklin Stacey, Joseph Allen Tailby, Walter Priestley Thorn, Jorge Vargas-Heredia, William Henry Weed, Charles Thompson Willard.

The St. Louis College of Pharmacy has elected the following faculty : Professor of Chemistry, C. O. Curtman, M. D., Ph. G. ; Professor of Materia Medica and Botany, O. A. Wall, M. D., Ph. G. ; Professor of Pharmacy, J.

M. Good, Ph. G.; Professor of Practical Pharmacy, Francis Hemm, Ph. G.; Professor of Microscopy, H. M. Whelpley, Ph. G. This is the first election made under the new charter, which abolishes the system of annually electing a faculty. The present professors will hold their positions until their resignation is accepted or they are removed for just cause.

The Alabama Pharmaceutical Association met at Selma, May 9th, the President, J. B. Collier, in the chair. The President's address and the reports of officers, committees and of the Pharmacy board were read and duly considered, and resolutions were passed favoring the reduction of the internal revenue tax on alcohol, and the repeal of the clause in the internal revenue law classifying druggists as liquor dealers. Papers were read by Albert E. Brown on emulsions of cod liver oil and of other oils; by T. T. Boyd on the action of medicines; and by E. P. Galt on antipyrin and spirit of nitre. President J. B. Collier, Secretary P. C. Candidus and Treasurer E. P. Galt were re-elected to these offices. The eighth annual meeting will be held at Birmingham on the second Tuesday in May (14th), 1889.

The Delaware Pharmaceutical Society held its annual meeting in Wilmington, May 3rd. The usual routine business was transacted; some changes were made in the constitution and by-laws; certain provisions of the pharmacy law were discussed, and a committee on the preliminary revision of the Pharmacoposia was appointed. The officers of the preceding year were continued, viz.: H. R. Bringhurst, president; J. M. Harvey, secretary, and J. J. Gallagher, treasurer. The next meeting will again be held in Wilmington on Thursday, May 2d, 1889.

The Indiana Pharmaceutical Association held its seventh annual meeting at Fort Wayne, June 6th. The usual routine business was transacted and a number of papers were read, among them one on "College Diplomas Recognized by Boards of Pharmacy," by A. J. Detzer; "Effect of Light on Fluid Extracts," by J. K. Lilly; "Random Notes," "Syrup of Ipecac," and "Wax in Ointments," by L. Eliel; "White or Yellow Wax in Cerates," and "Morphine Oleate," by W. H. Ross. Mr. A. L. Green, of Lafayette, was elected president; J. R. Perry, of Indianapolis, secretary, and H. Pomeroy, of Indianapolis, treasurer. The eighth annual meeting will be held at Indianapolis in 1889, at the same time as the meeting of the State Medical Society.

The Iowa Pharmaceutical Association met at its ninth annual meeting in Des Moines, May 2, President W. C. Bryant in the chair. The president's address and the reports of officers and committees were received and disposed of. Resolutions were passed in favor of reducing the tax on alcohol, and of abolishing the liquor dealer's tax on druggists. The new liquor law of Iowa materially modifies or repeals some of the provisions of the pharmacy law, and it was the opinion of those present that after the expiration of the permits now held by them, pharmacists cannot sell liquor with any degree of self or professional respect. Papers were read by H. Tiarks, on "Detannating Fluid Extracts;" by F. Lax, on "The Preparation of Galeni-

cals from Fluid Extracts;" by William Merschel, on "Nitrous Ether;" by F. O. Goldthwaite, on "Concentrated Spirit of Nitrous Ether;" by C. Schadt, on "Commercial Tincture of Chloride of Iron"; and by the same member on "Mucilage of Acacia." R. W. Crawford, of Fort Dodge, was elected president; Rosa Upson, secretary, and J. B. Webb, of DeWitt, treasurer. The next meeting will be held in Dubuque, on the first Wednesday (5th) of June, 1889; T. W. Ruete, local secretary.

The Kansas Pharmaceutical Association convened at Abilene, May 16, President R. S. Drake in the chair. Reports were received from the officers and a number of committees, and various addresses were delivered, including the annual address by the president, and one on "The Advancement of Pharmacy," by Prof. L. E. Sayre. Papers were read by Miss Rice, on "Commercial Baking Powders;" by M. L. Stone, on "The Prevention of Errors in Dispensing Poisons;" by H. Curry, on "Compound Spirit of Lavender;" by Prof. Sayre, on "The Possible Presence of an Alkaloid in *Astragalus molissimus*;" by R. S. Drake, on "Deviation from the Pharmacopœia;" by W. C. Johnston, on "The Metric System;" by F. E. Holliday, on "Excipients for Permanganate Pills;" by H. L. Raymond, on "Commercial Syrup of Ferrous Iodide;" by Prof. E. H. Bailey, on "Commercial Lead Chromate;" by A. J. Smith, on "Glycerin and Borax," and by George Weida, on "Cinchona Assays." W. W. Naylor, of Holton, was elected president; the secretary, assistant secretary, and treasurer were re-elected. The next meeting will be held in Atchison on the second Wednesday (12th) of June, 1889.

The Kentucky Pharmaceutical Association assembled in the Council chamber of Henderson to hold its annual meeting May 9, President J. W. Fowler in the chair. The annual address of the president was largely devoted to the injurious effects of patent and proprietary medicines, to the proposed amended pharmacy law, to the injustice of the liquor tax imposed on pharmacists, and to the necessity of pharmaceutical education, with words of encouragement and commendation to those young men seeking such professional advancement. Several papers on practical subjects and on ethical questions were read, and considerable discussion was had on the new draft of a pharmacy law, and on several clauses of the liquor law. W. S. Johnson, of Henderson, was chosen president, and W. B. McRoberts, of Stanford, and J. J. Brooks, of Richmond, were re-elected secretary and treasurer respectively. The twelfth annual meeting will take place at Crab Orchard Springs on the third Wednesday (15th) of May, 1889.

The Louisiana State Pharmaceutical Association had a large attendance at its sixth annual meeting, held in New Orleans, May 8th. President C. L. Keppler, in his annual address, referred to the healthy condition of the Association, to the Pharmaceutical department organized in connection with the medical school of Tulane University, to the proposed pharmacy law and to various local matters. The different officers and committees presented their reports which were duly considered and properly disposed of.

Among the papers read were the following: "Preparation and Preservation of Hypodermic Solutions," and "Preservation of Medicated Waters," by F. Lascar; on the "Morphimetric Assay of Opium," by R. N. Girling and T. R. Keene, and several on counter prescribing. A resolution was passed authorizing the secretary to purchase 300 copies of the National Formulary for the use of the members. The president C. L. Keppler, the recording secretary, L. F. Chalin, and the corresponding secretary, Mrs. Eliza Rudolf were reelected to these offices, and Erich Brand, of New Orleans, was elected treasurer. The Association finally adjourned to meet again in New Orleans on the second Wednesday (10th) of April, 1889.

The Massachusetts Pharmaceutical Association held its seventh annual meeting in the lecture room of the Massachusetts College of Pharmacy, June 5, President Manning delivered his annual address. The secretary, treasurer and the various committees presented their reports, and Mr. Whitney reported on the work done by the Pharmacy Board. Papers were read by H. Canning on "Liquor Sales and Liquor Licenses;" by B. F. Stacey on "Pharmacy Laws;" by A. P. Hemphill on "Internal Revenue and Temperance;" by L. L. Jenkins on the "Sale of Opiates;" by Prof. Markoe on "Incompatibles in Prescriptions;" by J. W. Colcord on "Ingluvin;" by J. A. Rice on "Vanilla and Vanillin;" by E. C. Durkee on "Extract of Vanilla," and on "Polish for Marble;" by A. D. Mowry on "Triturates;" by W. P. Draper on "Mucilage of Acacia;" and by H. J. Richardson on "Plasters." President for the current year, is B. F. Stacey, of Charlestown; secretary, J. W. Colcord, of Lynn, and treasurer, T. B. Nichols, of Salem. The next meeting will be held at New Bedford, in June, 1889, the date to be announced by the executive committee; F. R. Hadley is local secretary.

The Nebraska State Pharmaceutical Association had its seventh annual meeting in Lincoln, May 8th, president M. E. Shultz in the chair. The first business transacted was the consideration of amendments to the by-laws, reported on by a special committee. The annual address of the president and the reports of officers and of standing and special committees furnished considerable matter for discussion and action. The establishment of a School of Pharmacy in connection with the State University was favorably considered. Papers on apprentices, on progressive pharmacy, and on the influence of patent medicines were read. W. B. Shryock of Louisville is president for the current year. The secretary, C. J. Daubach of Lincoln, and the treasurer, J. Forayth of Omaha, were reelected. The next meeting will again be held at Lincoln, on the second Tuesday (14th) of May, 1889; local secretary, A. J. Shilling.

The New Jersey Pharmaceutical Association assembled in Morristown, May 23d, at its eighteenth annual meeting, President G. S. Cook in the chair. The usual reports by the secretary and treasurer were read, the latter being coupled with the request by Mr. Wm. Rust to be relieved of the duties of treasurer at the close of the fiscal year, in February next. The president's report dealt largely with the relations between physicians and pharmacists, and with certain provisions of the pharmacy law. Reports were also read

on legislation, on internal taxation, on cutting of prices, and on other subjects, and invited considerable discussion. Papers were read by Dr. Eccles on "Colorless hydrastis;" by P. Hommel, on "Tasteless quinine mixtures," "Tincture of musk," and one entitled, "From seed to seed;" by A. Drescher, on "Opium Assay," and by F. B. Kilmer, on "Pharmaceutical legislation in New Jersey." A resolution was passed instructing the secretary to procure and send to each member of the Association a copy of the "National Formulary," about to be published. George H. White, of Jersey City, was elected President; W. M. Townley, of Newark, treasurer, and F. B. Kilmer, of New Brunswick, was re-elected secretary. The next meeting will be held in Bridgeton, the date to be fixed by the Executive Committee.

The *Pennsylvania Pharmaceutical Association* held its eleventh annual meeting in the armory of a military company in Titusville, commencing June 12th. Owing to the great distance many of the visiting members had to travel, the first session was held at 8 o'clock in the evening, when the local secretary, C. D. Lippincott, introduced the Hon. Mr. Schwartz, mayor of the city, who, in a brief address, welcomed the members to the hospitalities of the city. The president, W. L. Turner, of Philadelphia, responded, and then delivered his annual address, dwelling on the relation between pharmacy and medicine, urging thorough education, particularly in all that pertains to practical pharmacy, and referring to various matters of interest to the Association. The treasurer's report showed a cash balance on hand amounting to \$259.31, and a considerable amount due from some of its members. The total number of active members is 599. The different committees presented their reports, which were appropriately disposed of. A proposition made to abolish the admission fee was amended, that it be reduced to \$1.00. It was also proposed that newly elected members, having paid the admission fee and annual dues be hereafter furnished with a certificate of membership without additional charge. This requires an alteration of the by-laws, and was withdrawn at the last session for want of time. The furnishing of papers, or abstracts of the same for publication, was discussed, the Association declining to part with the papers, but leaving it to the authors to furnish to newspapers or journals copies or abstracts of their papers after they had been read before the Association. A recommendation was adopted that the committee on adulteration and sophistication give particular attention to the class of liquid officinal preparations usually sold by general dealers, and where possible give such information to the pharmacy board as will enable them to prosecute violations of section 9 of the pharmacy law.

The committee appointed to attend the meeting of the State Medical Society at Bedford Springs in 1887, reported their cordial reception and the favorable action taken by the Society. A committee of five on the relations of medicine and pharmacy was subsequently directed to be appointed, and it is the intention of amending the by-laws at the next meeting, with the view of making this a standing committee.

The following papers were read:

A Concise History of Pharmacy, with conspicuous contrasts, ancient and

modern, by Wm. Harris. The paper cannot be abstracted; quotations from several works, particularly from the London Dispensatory of 1718, showed the progress made in pharmacy up to the present time.

Should Druggists Register as Physicians? Mr. Harris referred to the charter of the Society of Apothecaries in England, and endeavored to deduce therefrom the right of pharmacists to practice medicine. Stating that the law of Pennsylvania gives to apothecaries having practiced medicine and pharmacy for a period of ten years prior to June 8th, 1881, the right to register as physicians, he answered the above query in the affirmative. The arguments advanced by the author, and more particularly the conclusion, were warmly contested by Mr. Doble and other members. In the discussion the eleventh section of the pharmacy law, giving graduates in medicine the right to register as pharmacists without examination, was deservedly criticized; but it was contended that a similar wrong should not be committed in retaliation.

The Promotion of Fraternal Feeling Among Pharmacists, by W. H. Reed. The good influences of associations and attendance at their meetings are discussed in their various aspects.

The Preliminary Training of Apprentices, by G. W. Kennedy. Not only is the necessity of a good school education emphasized, but other requirements are pointed out, like habits of preciseness, politeness in conversation, cultivation of judgment, etc.

Impure Cream of Tartar. Frank Thompson had found the cream of tartar offered by several drughouses to be pure, while samples obtained from grocers contained from twenty-five to seventy-five per cent. of starchy matter, which was left behind on dissolving the bitartrate in potassa solution.

Paris Green. G. W. Kennedy examined six commercial samples and found five of them to be substantially pure, though containing uncombined arsenious acid which could be extracted by ammonia. One sample contained nearly twenty per cent. of white clay.

Irish Moss as a Substitute for Gum Arabic. J. F. Patton confirms the utility of Irish moss in the preparation of emulsions.

Pepsin. Wm. Harris advocates the admission into the next pharmacopoeia of a pepsin digesting at least nine hundred times its weight of coagulated albumen in five or six hours at a temperature of 105° F. Its preparation is neither very difficult nor costly, and any apothecary of ordinary skill can prepare and have it fresh and reliable. Samples were exhibited prepared by the author.

Abstractum Jalapæ by Wm. L. Turner. Seven samples of jalap, on being assayed, yielded from 6.35 to 10.86 per cent. of resin; from the latter sample, by careful selection, a small quantity could be obtained yielding the required 12 per cent., and a sample procured from Dr. Squibb yielded 19 per cent. of resin. In view of this great variation, it is proposed to prepare the abstract by thoroughly incorporating one part of resin of jalap with three parts of sugar of milk.

Two of the papers read at the meeting are published in this number;

they are entitled "The genus *Luffa*" and "Notes on some old remedies." Of the paper by Mr. Jos. W. England, "Reference table of doses," the introductory part will be found on another page, and it is proposed to print the table in the next number.

The officers elected are Wm. Harris of Hamburg, president; John W. Miller of Allegheny and J. H. Stein of Reading, vice presidents; J. A. Miller of Harrisburg, secretary and Jos. L. Lemberger of Lebanon, treasurer. The association adjourned on Wednesday night to meet next year in Scranton on the second Tuesday (11th) of June; Wm. H. McGarrah was elected local secretary.

Owing to arrangements previously made by the druggists of Titusville for an excursion, the Association finished its labors on Wednesday, the fourth session closing at 11 P. M. On Thursday morning the members and friends, numbering about two hundred, left on the 7.45 train for Mayville, and there took a steamer which conveyed the party to some of the places of interest on Lake Chautauqua. Coleman's band was in attendance, and dancing was indulged in by some of the company. The party landed at Jamestown, N.Y., where dinner was taken at the Sherman House, and where they were hospitably received by the Mayor and the druggists. From here several of the members started for home, others left at Corry, and the majority departed from Titusville by early train on Friday. A party of nine drove on Friday forenoon to the farm of Mr. W. P. Black, nine miles from Titusville, to witness the shooting of an oil well. Sixty quarts of nitroglycerin were lowered in three canisters to a depth of 900 feet, and after having been exploded, ejected from the depth a mixture of water, mud and oil with such a force as to carry off the top of the derrick. This to the visitors' novel sight amply repaid for the delay. After all the visitors had left, Titusville and the neighboring country was, on Friday evening, visited by severe thunder storms, causing considerable damage to property and, for a time, interrupting travel by railroad.

The Virginia Pharmaceutical Association commenced its seventh annual meeting in Danville May 8th, and adjourned on the next evening. President R. Brydon read his annual address, making various recommendations, with the view of increasing the interest in the meetings. Reports were read from the officers and the various committees, including one on the National Formulary. The proposition requiring on each label of patent medicines a quantitative formula was favorably considered. Papers were read by Prof. F. P. Dunning on "Oxidation of Sulphites;" by T. F. Knock, on "Hydronaphthol;" by J. A. Miller, on "Simple Syrup;" by A. W. Jacobs, on "Oils of Orange and Lemon," and by J. W. Thomas, on "Peanut and Cotton-seed Oils." Dr. E. A. Craighill was elected president, and the following officers were re-elected: C. B. Fleet, secretary; T. Roberts Baker, corresponding secretary, and F. H. Masi, treasurer. The next meeting will be held at the Hygeia Hotel, Old Point Comfort, on the third Tuesday (18th) of June, 1888. The local secretary is F. H. Masi, of Norfolk.

EDITORIAL DEPARTMENT.

Medical and Pharmaceutical Congresses at Barcelona, Spain.—During the latter half of the present year a universal exposition will be held in Barcelona, and recently arrangements have been perfected for the holding of two congresses, one medical and the other pharmaceutical, during the month of September. Membership may be secured by the payment of an inscription fee of ten francs. All members may participate in the proceedings and the discussions; but persons not possessing an academic title giving authority to practice a profession, are required to present written communications to a scientific subcommittee for preliminary consideration. The official language will be Spanish; but written and verbal communications may be presented in any other Romance language, accompanied with a condensed abstract giving the conclusions. A joint public session of both congresses will be held September 9th, at noon, after which each congress will organize separately and transact the business coming before it in four sections. The final adjournment will take place September 15th, when the minutes and essays will be handed to the Committee on Organization for publication.

The four sections of the pharmaceutical congress and the subjects assigned to each section for deliberation, are as follows.

Section on general questions.—1. Theories of chemistry best adapted for the study of pharmacy.

2. Processes of disinfection in various epidemics; the disinfectants meriting preference, and their chemical action.

3. The importance of artificial mineral waters, and the conditions for arriving at reliable conclusions on this subject.

4. The study of natural medical substances.

5. The influence of Spanish authors on the progress of pharmacology.

6. The theories of fermentation.

Section on Pharmacology.—1. Pharmaco-zoological and pharmaco-physiological study of gum lac.

2. The conditions under which ranunculaceous drugs should be employed for preparations with the view of securing the greatest activity.

3. The pharmacological importance of the localization of the active principles of plants.

4. The preparation of volatile oils from Labiatae in Spain.

Section on Practical Pharmacy.—1. Bismuth subnitrate of the Spanish pharmacopoeia, its uniformity of composition and permanence.

2. Advantages and disadvantages of lanolin and petrolatum in ointments.

3. The extracts and the methods of their preparation.

4. Pharmaceutical legislation in regard to the progress of pharmacy.

Section on Chemistry.—1. The means of combining astringents with iron preparations without altering their properties or lessening their effects.

2. The chemistry and pharmacy of compounds of antimony.

3. The best reagents for the analysis of urine.

4. Importance of spectral analysis.

Elixir of Theine Hydrobromate.—The quantity of acid directed in the formula, published on page 282, should be f3i (instead of f3i). The corrected formula reads: Theine, 90 grains; dilute hydrobromic acid and water, of each, 1 fluidounce; elixir of orange, sufficient for one pint.

The *Druggists' Mutual Fire Insurance Company* has been brought to the notice of the members of the drug trade who were present at the recent meetings of the various State Pharmaceutical Associations. A year ago the company was organized under the auspices of the National Wholesale Druggists' Association; a charter was obtained under the laws of Pennsylvania, and active business was commenced October 17th, 1887. The central office is located in Philadelphia in the Forrest building, 119 South Fourth street, and the business is conducted by a Board of Directors and an Executive Committee, composed of prominent druggists, residing in the principal cities from Maine and the Atlantic States to Louisiana and Minnesota.

The original capital consists of an advance premium fund of \$100,000, bearing six per cent. interest, and it is intended to reserve the accumulating profits until a capital of \$200,000 is secured, when the profits will be employed in cancelling the scrip certificates, to be issued annually to the policy-holders, after the profits for the past year have been determined. The rates of insurance charged are the same as those established by the stock companies; but the policy-holders will participate in the profits, the dividend scrip bearing interest. In this manner, the benefits of the company are mutual, and the policy-holders are exempt from all assessment.

Though organized by druggists primarily for the benefit of druggists, the company will accept also risks of buildings, household goods and other property of no more hazardous nature than drug stocks, a careful scrutiny being made of both the moral and material hazard.

Moreover, the company considers it as a prominent part of its mission to encourage by every possible means the thoughtful consideration of all methods for reducing fire hazard, and thus to lessen the losses, and increase the amount of dividend to each policy holder. A circular intended to be posted in conspicuous places, has been issued, giving plain and intelligent advice in regard to the storage and handling of goods, waste and packing material; the use of lamps, gas, steam, electricity, and to other matters which under various circumstances may cause explosions or conflagrations.

The present officers of the company are Robert Shoemaker, president, Edward H. Hance, treasurer, and E. R. Hunt, secretary.

The National Formulary of Unofficial Preparations will be issued before the present number of the *JOURNAL* reaches our readers. It contains about 190 octavo pages, and gives 435 formulas for preparations in daily use by pharmacists and druggists. As stated in our last number, it will be for sale by the acting authorized agents of the American Pharmaceutical Association, also by wholesale druggists, booksellers, and others interested in the work. The price, including postage, has been fixed at 75 cents, bound in cloth; \$1.10, cloth, interleaved; 90 cents, cloth, with raised nail, and \$1.10 bound in sheep.

Prize Studies of Tornadoes.—The *American Meteorological Journal*, desiring to direct the attention of students to tornadoes, in hopes that valuable results may be obtained, offers the following prizes: For the best original essay on tornadoes, or description of a tornado, \$200 will be given. For the second best, \$50. And among those worthy of special mention \$50 will be divided.

The essays must be sent to either of the editors, Professor Harrington, Astronomical Observatory, Ann Arbor, Michigan, or A. Lawrence Rotch, Blue Hill Meteorological Observatory, Readville, Mass., U. S. A., before the first day of July, 1889. They must be signed by a *nom de plume*, and be accompanied by a sealed envelope, addressed with same *nom de plume*, and enclosing the real name and address of the author. Three independent and capable judges will be selected to award the prizes. A circular giving fuller details can be obtained by application to Professor Harrington.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Twenty-ninth Annual Report of the Inspector of Milk and Vinegar. Boston: Rockwell & Churchill, printers, 1888, 8vo., pp. 76.

A comprehensive report giving the results of the investigations made by the inspector, Prof. Jas. F. Babcock, during the preceding year. The good effect produced by these continued inspections is shown by a number of tables and by graphic representations of the steady increase of the percentage of pure milk sold in Boston during the years, 1883 to 1887.

Foods and Food Adulterants. Part third: Fermented alcoholic beverages, malt liquors, wine and cider. By C. A. Crampton, Assistant Chemist. Washington: Government Printing Office, 1887, pp. 261-399.

The pamphlet enters very fully into the examination of the three classes of beverages mentioned in the title, and gives interesting details of the analytical researches into the proportion of the proximate constituents of the beverages, and the presence of adulterations. We mention here only that out of seventy samples of American wines, eighteen, or over one-fourth, had received an addition of salicylic acid, and thirteen had been preserved by the use of sulphurous acid, either as such or in the shape of a sulphite; one of the samples contained both these agents. Of forty samples of red wines one was found to be artificially colored with aniline red.

Kinologische Studien. Dr. J. E. De Vrij.

"Quinological Studies" is the general title of some sixty papers by Professor De Vrij published in the "*Nieuw Tijdschrift voor de Pharmacie in Nederland*," for reprints of a number of which we are indebted to the author, who as is well known, has given many years of labor to investigating the composition of cinchona barks, and the chemistry of the cinchona alkaloids.

The Texas Health Journal. Edited by J. R. Briggs, M. D. Published by the Health Journal Publishing Company, Dallas, Texas.

This is a new monthly, which will be regularly issued, beginning with July. It will be devoted to hygienic matters, which, it is intended, will be presented in a manner comprehensive to all intelligent persons. Each number will contain 32 pages, and the subscription price will be \$2.00 per year.

Fifth Annual Report of the Board of Control of the State Agricultural Experimental Station, at Amherst, Mass. Boston, 1888; 8vo., pp. 267.

This comprehensive report by the director, Professor C. A. Goessmann, is for the year 1887, and gives a full account of the work done at the Station during that year.

Nineteenth Annual Report of the State Board of Health of Massachusetts. Boston, 1888, pp. 875.

This, like the preceding, is one of the Public State Documents for the year 1887. It contains reports on water supply and sewerage, on sewage disposal, on food and drug inspection, on oleomargarin, on mortality, and on the heating and ventilation of school houses.

Russian and American Petroleum. By Prof. S. P. Sadtler. Pp. 12.

A reprint from the May number of the Journal of the Franklin Institute of a lecture delivered before the Institute by the author.

OBITUARY.

Rachel L. Bodley, M. D., professor of chemistry and dean of the Woman's Medical College, died in Philadelphia June 15th, at the age of 56 years. The deceased was identified with the above College for 23 years, and was one of its most valued teachers. Botany and chemistry were her favorite sciences. Fourteen years ago she suggested the propriety of celebrating the one hundredth anniversary of the discovery of oxygen by Priestley; the suggestion was carried out, and at the "Centennial of Chemistry" which took place at Northumberland, Pennsylvania, the last home and resting place of Priestley, she was elected vice president, though absent on a botanical excursion to Colorado. She was a native of Cincinnati, O.

Theodor Ronnefeld, for many years in business in Detroit, died in that city after a lingering illness, June 9th, aged 56 years. He was an excellent pharmacist, an upright man, an agreeable companion, and a warm hearted friend.

Lorren S. Vincent, Ph. G., class 1886, died at Flint, Michigan, May 27th. He was born in Genesee Co., N. Y., January 11th, 1860, and at the age of eight years came with his parents to Flint, where after graduating from the high school, he learned the drug business and subsequently attended the Philadelphia College of Pharmacy. He commenced business in Dayton, O., but failing in health he was compelled to relinquish it about a year ago.

COMPRESSED LOZENGES

OF THE

UNITED STATES PHARMACOPŒIA,

BRITISH PHARMACOPŒIA,

LONDON THROAT HOSPITAL (Dr. Morell Mackenzie),

AND

UNOFFICIAL FORMULÆ.

The kind favor and cordial endorsement extended by the Drug Trade and Medical Men to our Compressed Pills, Compressed Tablets and Compressed Hypodermic Tablets, have induced us to extend our line, and to manufacture the above class of preparations, which are in more general popular demand than almost any other, containing active medicinal ingredients. We do not desire that this series of preparations, as prepared by us, shall be confused with the numerous confections and pasty mixtures, so much in vogue. Our Lozenges are intended, strictly and exclusively, for medicinal purposes. They embrace all those authorized, by the United States Pharmacopœia, British Pharmacopœia, the London Hospital for Diseases of the Throat, and a number of unofficial combinations that have long been recognized by the profession, as almost standard remedial agents, as well as having a wide-spread and popular demand. Our novel and peculiar process of compressing from perfectly dry powders, insures permanency and freedom from atmospheric influences, so apt to affect and render unsightly, these preparations, as generally manufactured; this, together with the perfection of our machinery, enables us to produce a Lozenge of exact weight, accuracy of dose, beauty of finish, and thorough admixture of active medicinal ingredients, which must commend them to all, and supply a want long felt. We feel assured from the favor already evinced, wherever we have shown our Lozenges, they will receive the cordial endorsement of the profession, and consumers generally.

Our compressed Lozenges are put up in one pound glass stoppered bottles and can be obtained from all leading wholesale druggists. Specify Wyeth's when ordering.

We will be glad to mail complete lists, with prices, to anyone who may desire them.

JOHN WYETH & BROTHER,

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Powd. Ext. Black Haw....."	50	Powd. Ext. Jam Dogwood....."	1 20
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Vol. 60

AMERICAN

No. 8

JOURNAL OF PHARMACY.

PUBLISHED BY AUTHORITY OF THE

PHILADELPHIA COLLEGE OF PHARMACY.

Under the supervision of the Publishing Committee, consisting of

HENRY N. BITTENHOUSE, JAMES T. SHINN, CHARLES BULLOOK, T. S. WIEGAND,

AND THE EDITOR

JOHN M. MAISCH.

Price, \$3.00 per Annum, }
in advance. }

{ Issued in Monthly numbers of
not less than 48 pages. }

Single No. }
30 cts. } Fourth Series.

AUGUST, 1888.

Vol. XVIII., No. 8

CONTENTS.

Oxy Salts of Bismuth. By Frank X. Moerk, Ph. G. 385
Analyses of American Plants. Abstracts from Theses 389
Reference Table of Doses. By Joseph W. England, Ph. G. 391
Gleanings from the German Journals. By Frank X. Moerk, Ph. G. 399
Abstracts from the French Journals. Translated for this Journal 404
Systematic Examination of Sulphate and Hydrochlorate of Quinine. By C. Hielbig. 411
Characters of Antipyrin 413

Pyridine. By D. J. Leech 418
Separation of Resins. By G. Kliebhau . . . 420
Estimation and Separation of Meta's by Means of Sodium Pyrophosphate. By G. Vortmann 421
Action of Bleaching Agents on Writing Ink. By R. Irvine 422
Pharmacopœia of the Philadelphia Hospital, (continued) 423
State Pharmaceutical Associations . . . 425
Editorial 427
Reviews and Biographical Notices 430

NOTICE TO READERS.

This Journal is devoted to the advancement of PHARMACEUTICAL KNOWLEDGE and to the advocacy of a MORE THOROUGH EDUCATION and PRACTICAL TRAINING for all persons engaged in PREPARING and DISPENSING medicines and chemicals.

It embodies a large amount of information EXTREMELY VALUABLE TO APOTHECARIES, DRUGGISTS and PHYSICIANS—comprehending, in fact, a faithful record of the development of PHARMACEUTICAL SCIENCE AND INVENTION both in Europe and America, during the period of its issue, commencing with 1829.

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LARGE NUMBER OF FORMULAS, are contained in it, including many which, though not official, are valuable and in use.

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Address all papers for publication, etc., to the Editor JOHN M. MAISCH.

All communications relating to subscriptions, advertisements, etc., to the Business Editor, H. H. WOLLE, 143 North Tenth Street, Philadelphia, Pa.

Meetings of State Pharmaceutical Associations.

STATE.	TIME.	PLACE.	LOCAL SECRETARY.
Dakota, North,	Aug. 7.	Jamestown,	H. E. White.
Dakota, South,	Aug. 21.	Huron,	J. A. Keith, Lake Preston.
Illinois,	Aug. 21.	Peoria,	L. C. Hogan, Englewood.
Maryland,	Sept. 19.	Baltimore,	M. L. Byers, Hagerstown.
Michigan,	Sept. 4.	Detroit,	Jas. Vernor.
New Hampshire,	Sept. 4.	Concord,	C. Spofford, Claremont.
North Carolina,	Aug. 8.	Goldsboro,	H. C. Shannon,
Wisconsin,	Aug. 6.	Palmyra,	C. Yates.

AMERICAN PHARMACEUTICAL ASSOCIATION.

SECTION ON SCIENTIFIC PAPERS.

"To Members of the American Pharmaceutical Association."

By vote of the Association at its last meeting, it was resolved that all papers for discussion in the section on Scientific Papers be printed previous to the September meeting, so that copies of them may be placed in the hands of the members present to facilitate the discussion.

In order that this may be done, papers should be in the hands of the Committee by the tenth day of August. They should be addressed to Dr. A. B. LYONS, Detroit, Michigan, Post Office Box 583. The earlier they are sent in, the better. Short practical papers are especially desired. Remember that in addition to the standing offer of the Ebert prize, there are to be awarded this year three special prizes, aggregating \$150, for the three best papers that shall be submitted at the September meeting.

T. ROBERTS BAKER,
A. B. LYONS,
J. M. GOOD, } *Committee.*

PENNSYLVANIA PHARMACY BOARD.

The next examination will be held in October, at Philadelphia and Pittsburg. Applicants for examination should apply to the Secretary of the Board, H. B. COCHREN, Lancaster, Pa., late in September, for the exact date and place of the meeting.

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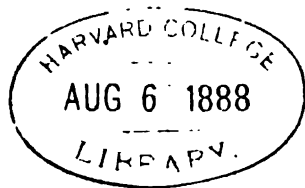
The 123rd ANNUAL WINTER SESSION will begin Monday, Oct. 1st, at 12 M. and continue 7 months.

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THE AMERICAN JOURNAL OF PHARMACY.

AUGUST, 1888.

OXY SALTS OF BISMUTH.

BY FRANK X. MOERK, PH. G.

Contribution from the Chemical Laboratory, Philadelphia College of Pharmacy.

While attention has frequently been called to the high percentage of oxide which is yielded by the commercial subnitrate, the formula $(\text{BiO})_2 \text{CO}_3 \cdot \text{H}_2\text{O}$ appears to be accepted as representing the composition of the subcarbonate.

Some recent analyses of these compounds may be of interest, although no attempt was made to represent the different makes.

BISMUTH SUBNITRATE.

These were examined for:

Moisture, by drying at 140°C . for $1\frac{1}{2}$ hours. It was ascertained by analysis that the nitric acid or nitric oxide was not volatilized at this temperature.

Nitric oxide, by boiling with excess of decinormal NaOH for one hour and then titrating the excess of NaOH with decinormal oxalic acid. Every cc. NaOH represents 0.0054 N_2O_5 . Phenolphthalein was used as the indicator. If other acids are present, this method furnishes high results, but in the samples examined only traces of HCl were found. Bismuth oxide was determined by ignition.

	H_2O .	N_2O_5 .	Bi_2O_3 .	Impurities.
$\text{BiONO}_3 \cdot \text{H}_2\text{O}$	5.88	17.64	76.47	
No. 1.	2.95	15.98	80.96	H_2CO_3 , and HCl .
No. 2.	3.02	16.20	80.70	
No. 3.	3.62	16.04	80.35	HCl .
No. 4.	2.35	15.77	81.85	HCl

Calculating the amount of subnitrate from the N_2O_5

$\text{BiONO}_3 \cdot \text{H}_2\text{O}$	BiONO_3	Bi_2O_3	H_2O
	94.12		5.88
No. 1.	85.23	11.71	2.95
No. 2.	86.40	10.50	3.02
No. 3.	85.55	10.84	3.62
No. 4.	84.11	13.51	2.35

It will be seen that the amount of water present is generally less than half of that required in the formula $\text{BiONO}_3 \cdot \text{H}_2\text{O}$. The anhydrous samples are very hygroscopic, regaining during twelve hours exposure almost the entire amount present in the sample before heating, (No. 1. regained 2.39 per cent. moisture). The oxide is considered as being produced by washing the salt, and a few experiments in this direction may be interesting. Ten gm. of the subnitrate (No. 1.) were placed in a small percolator and water poured over it, the percolate was caught in portions of 10 cc. and the acid present estimated by means of dilute soda solution; the quantity indicated was surprisingly constant, equaling 0.03 per cent. and containing bismuth in solution. If the percolate was returned, it contained acid to the extent of 0.06 per cent. and a correspondingly larger quantity of bismuth in solution; on allowing the percolator to stand over night and then displacing the liquid by fresh additions of water, the quantity of acid increased to 0.15 per cent. This is certainly of interest and might suggest that in the preparation of subnitrate the portion of water into which the acid solution of bismuth is poured, should be sufficient to furnish an acidulated water containing the above amount of acid. If the strength of the acid solution is less, the tendency is to make a more basic salt by abstraction of acid. The bismuth dissolved in the 0.15 per cent. acid can, after draining the precipitate, be collected after addition of sodium carbonate and be used in the preparation of the next lot. It would be desirable not to wash the precipitate, but to absorb the excessive liquid by some porous material after thorough draining. The U. S. P. (1870) process furnished an acid liquid—before the addition of the ammonia water—containing 0.04 % HNO_3 , which the ammonia water reduced to about 0.01 per cent. and at the same time formed a solution containing approximately 0.04 per cent. ammonium nitrate. Although it is known that the latter salt prevents (if present to the extent of 0.2 per cent.) the removal of nitric acid from basic bismuth salts, still it is doubtful if any favorable results are to be had from its

presence, after the nitric acid has been liberated and the more basic salt formed. To this very dilute acidulated solution is perhaps due the excessive basicity of the subnitrate to a greater extent than to the washing which is generally believed to be the cause.

BISMUTH SUBCARBONATE.

Moisture, bismuth oxide and nitric oxide as in the case of subnitrate. Carbon dioxide by loss on addition of H_2SO_4 in Schroetter's apparatus.

	H_2O	CO_2	Bi_2O_3	N_2O_5	Other impurities.
$(BiO)_2CO_3 \cdot H_2O$	3.40	8.30	88.30		
No. 1.	1.00	7.90	89.90	1.19	HCl. } <i>Traces.</i>
No. 2.	0.40	7.50	91.70	0.22	HCl. }
No. 3.	0.20	8.15	90.64	0.92	HCl. }

Calculating $(BiO)_2CO_3$ from CO_2 and $BiONO_3$ from N_2O_5 .

	$(BiO)_2CO_3$	H_2O	$BiONO_3$	Bi_2O_3
$(BiO)_2CO_3 \cdot H_2O$	96.60	3.40		
No. 1.	91.93	1.00	6.35	0.71
No. 2.	87.50	0.40	1.17	10.75
No. 3.	94.84	0.20	4.91	

These results also show the absence of an amount of water representing a molecule. In the National Dispensatory is the statement that, if the mixture resulting from the addition of the bismuth nitrate to the sodium carbonate solution be boiled, an anhydrous subcarbonate is produced. The presence of the subnitrate was detected in each case by using H_2SO_4 tinted with indigo solution. To ascertain if this impurity was due to defective manipulation two experiments were made, one in which the mixture of bismuth nitrate and excess of sodium carbonate was heated to $55^\circ C.$, in the other heat was applied so as to keep the mixture very near the boiling point; both precipitates were thoroughly washed, but on examination both contained nitric acid, in small quantity; the one prepared at the lower temperature containing more than the other. In consideration of these experiments and the fact that the commercial product contains such a small percentage of water, the recommendation is thought well-based to make the subcarbonate by using a boiling solution of sodium carbonate and adding thereto the bismuth nitrate solution with the additional precaution of boiling vigorously for several minutes after the

addition of the latter solution. Although yielding an anhydrous product, it will be free from more than traces of nitrate.

BISMUTH OXYIODIDE.

Although this preparation does not excite so much attention as it did about a year ago, attention is called to it again in this paper because of the examination of the other two salts. The difficulties which were experienced by most writers on this subject are to be traced to the admixture of the subnitrate with oxide, the latter compound not being altered by KI, and also preventing a portion of the subnitrate from undergoing this change into oxyiodide.

But now knowing the limits in which oxide is present in the subnitrate, the requisite amount of HNO_3 can be added to the so-called subnitrate, and the true subnitrate or its equivalent obtained, which easily enters into reaction with KI and forms the pure oxyiodide and KNO_3 .

In the following formula sufficient nitric acid is used to convert a subnitrate containing about 18 per cent. of oxide into the true subnitrate, the presence of the small quantity of free HNO_3 which may be present being in a large quantity of water exerts no decomposing action upon the oxyiodide, although if an excess of KI be present, vapors of iodine may be evolved.

Bismuth subnitrate.....	20 gm.
HNO_3 (sp. gr. 1.42).....	1 cc.
Water.....	300 cc.
KI.....	12 gm.

Boil the subnitrate with the nitric acid and 200 cc. water for 10 minutes, then add the potassium iodide dissolved in 100 cc. water, boil for half hour, filter and wash thoroughly until washings cease to give more than turbidity with silver nitrate. Dry at a temperature not above 100°C .

This furnishes a pure salt, and although in an extremely fine crystalline powder, shows its crystalline characteristic by a glistening film on the interior of the bottle in which it is kept.

Ergot of Oats has been used by Dr. Bousquet (*Union Méd.*, Feb. 19, 1888) who observed that its action was as prompt and lasting as that of ergot of rye, and that it has the advantage of acting as a general excitant and restorative in cases of prostration from prolonged labor or copious loss of blood.

ANALYSES OF AMERICAN PLANTS.

Abstracts from Thesea.

Rhus glabra.—Mainly with the view of determining the amount of tannin present at different periods, Jos. A. Palen, Ph. G., collected two lots of leaves, July 15th and August 30th, from plants growing on the bluffs bordering the Mississippi river near Dubuque, Iowa.

These were dried and powdered, and yielded the following analytical results:

	JULY.	AUGUST.
Petroleum extract.....	5.72	5.12
Volatile oil.....	.2	.1
Wax.....	1.5	1.22
Fats.....	4.02	3.8
Ether extract.....	5.6	4.86
Of which soluble in water.....	1.3	1.55
Alcohol extract.....	14.3	13.6
Tannin.....	10.8	10.1
Altered tannin, resin, etc.....	3.5	3.5
Water extract.....	10.92	12.15
Glucose.....	.87	.63
Cane sugar.....	.18	.21
Other carbohydrates.....	3.04	4.2
Mucilage.....	4.78	6.35
Extracted by soda.....	13.29	12.05
Albuminoids.....	6.21	5.6
Extracted by HCl.....	4.72	5.54
Calcium oxalate.....	3.36	3.87
Treatment with Cl (hydrocellulose).....	6.72	9.17
Treatment with HNO ₃ (incrusting matter).....	1.41	3.76
Moisture.....	4.6	4.4
Ash.....	.84	.34
Residue.....	25.2	27.84

A separate estimation of tannin was made by precipitating the decoction of the leaves with gelatin, and multiplying the weight by 0.54. The July lot yielded 16.36 per cent., the August lot 15.75 per cent. The tannin strength of both samples is practically alike, but is not so large as that of sumac leaves from Virginia, which yield from 20 to 25 per cent.

The coloring matter exists in very small amounts, and is probably alike with that of quercitron bark. The ethereal and alcoholic extracts of the leaves were examined; cloth prepared with different mordants, like ferric acetate, stannous chloride, copper sulphate, potas-

sium bichromate and alum, was dyed, the color being like that obtained with quercitron bark.

Helianthemum canadense was examined by Wm. Crutcher, Ph. G. Petroleum benzin extracted 1.15 per cent., containing a little volatile oil, wax and saponifiable fat. Ether dissolved 1.4 per cent. wax chlorophyll, etc. Alcohol took up 23.05 per cent., nine-tenths of which was soluble in water; the tannin was estimated by precipitating with lead acetate and cupric acetate, the results of both experiments indicating 10.8 per cent. of tannin. Water dissolved from the powder 7 per cent. mucilage, sugar, etc.; and dilute soda solution took up a little over 4 per cent. of pectin and albuminoids. The presence of starch was determined, but its amount not estimated. The air-dry powder contained 7 per cent. of moisture and 3 per cent. of ash. Indications of a glucoside having been obtained, the alcoholic extract was treated with water and the solution agitated with benzol; on evaporating this liquid fine needles were left, but not further examined.

Pilea pumila.—Frank R. Weiser, Ph.G., reports that this plant has some reputation for counteracting the effect produced by *Rhus Toxicodendron*. The fresh plant is bruised, and then applied either by binding it on the eruption, or by rubbing the affected parts with it; the effect seems to be instantaneous, allaying the itching and preventing the spreading of the eruption. The plant is popularly known as *clearweed* and *richweed*, and grows from Canada to Florida. After drying it has a somewhat fragrant tea-like odor. An analysis of the dried and powdered plant yielded the following results:

Extracted by petroleum spirit (volatile oil, .26; fat, .70; wax, .28; chlorophyll, .08).....	1.32
“ by ether (mostly chlorophyll).....	1.52
“ by alcohol (glucoside, etc.).....	1.00
“ by water (mucilage, dextrin, sugars, etc.).....	8.89
“ by dilute H ₂ O.....	4.90
“ by dilute HCl.....	9.02
Lignin.....	3.25
Wood fibre, ash and moisture.....	66.33

A portion of the alcoholic tincture obtained above on being allowed to evaporate spontaneously, yielded crystals, which responded to the tests for glucosides. Half pound of the powder was then percolated with alcohol, the tincture concentrated by distillation, the extract

treated with water, and the aqueous solution agitated with chloroform; the residue obtained on evaporating the chloroform was redissolved in water and evaporated in a desiccator, when a substance was left, having a strong vanilla-like odor, and which did not respond to tests for either alkaloids or glucosides.

REFERENCE TABLE OF DOSES.

By JOSEPH W. ENGLAND, PH. G.

(Concluded from page 343.)

In conclusion, the writer would distinctly state, that he does not claim perfection for this table, but he has earnestly striven, in its composition, to give not the highest possible dose, nor the lowest, but a fair and accurate expression of average doses, based upon such authorities as Wood, Stillé, Pepper, Bartholow, Squire, and others, together with data obtained in the annual compounding of 100,000 prescriptions in the Philadelphia Hospital. He presents his results with the hope that they may serve as a basis for more enlarged work, in this direction, by the Revision Committee, in the coming decennial revision of our Pharmacopœia.

The name of the drug is given in latin, while, for facility of reference, the dose is expressed in numerals instead of roman figures, which would doubtless be more consistent, but not nearly as ready of access.

DRUG.	DOSE.	DRUG.	DOSE.
Acetanilidum.....	3-5-15 gr.	Acid. Gallic.....	5-15-30 gr.
Acet. Lobeliæ, Expect...	$\frac{1}{2}$ - $\frac{1}{4}$ -1 fl. dr.	" Hydrobrom. Dilut.	$\frac{1}{2}$ -1-2 fl. dr.
Nauseant	1- $\frac{1}{2}$ -2 fl. dr.	Max.	2-4 fl. dr.
" Opii.....	5-10-15 m.	" Hydrochlor. Dilut.	10-15-30 m.
Maximum.....	15-20 m.	Max.	30-60 m.
" Sanguinar, Expect.	5-10-15 m.	" Hydrocyan. Dilut.	1-2-3 m.
Emetic	$\frac{1}{2}$ -1-2 fl. dr.	Max.	3-5 m.
" Scillæ.....	10-15-30 m.	" Lactic.....	$\frac{1}{2}$ -1-2 fl. dr.
Acid. Acetic. Dilut.....	2-3-4 fl. dr.	" Nitric. Dilut.....	5-15-30 m.
" Arsenios.....	$\frac{1}{15}$ - $\frac{1}{10}$ - $\frac{1}{8}$ gr.	Max.	30-60 m.
Max.....	$\frac{1}{15}$ - $\frac{1}{10}$ gr.	" Nitrohydrochlor..	2-3-5 m.
" Benzoic.....	10-15-30 gr.	Max.	5-10 m.
" Boric.....	10-15-30 gr.	" " Dilut.	10-15-20 m.
" Carbolio.....	1-2-3 gr.	Max.	20-30 m.
" Citric.....	10-15-30 gr.	" Phosphoric. Dilut.	10-30-60 m.

DRUG.	DOSE.	DRUG.	DOSE.
Acid. Salicylic.	10-15-30 gr.	Aqua Chlori.....	$\frac{1}{2}$ -1 fl. oz.
“ Sulphuric. Dilut...	10-15-20 m.	“ Chloroformi.....	$\frac{1}{2}$ -1-2 fl. oz.
“ “ Max.	20-30 m.	“ Cinnamomi.....	$\frac{1}{2}$ -1 fl. oz.
“ Sulphuric. Arom...	5-8-10 m.	“ Creasoti.....	2-3-4 fl. dr.
“ “ Max.	10-15 m.	“ Fœniculi.....	$\frac{1}{2}$ -1 fl. oz.
“ Sulphurosum.....	$\frac{1}{2}$ -1-2 fl. dr.	“ Menthæ Piperitæ. $\frac{1}{2}$ -1 fl. oz.	
“ Tannic	3-5-10 gr.	“ Menthæ Viridis... $\frac{1}{2}$ -1 fl. oz.	
“ Tartaric.....	10-15-30 gr.	“ Pimentæ.....	$\frac{1}{2}$ -1 fl. oz.
Aconitina.....	$\frac{1}{160}$ - $\frac{1}{80}$ - $\frac{1}{40}$ gr.	“ Rosæ.....	$\frac{1}{2}$ -1 fl. oz.
“ “ Max.....	$\frac{1}{160}$ - $\frac{1}{80}$ - $\frac{1}{40}$ gr.	Argenti Iodidum.....	$\frac{1}{2}$ -1-2 gr.
“ (Duquesnel's).....	$\frac{1}{160}$ - $\frac{1}{80}$ - $\frac{1}{40}$ gr.	“ Nitras.....	$\frac{1}{2}$ -1 gr.
“ “ Max.....	$\frac{1}{160}$ - $\frac{1}{80}$ - $\frac{1}{40}$ gr.	“ Oxidum.....	$\frac{1}{2}$ -1-2 gr.
Æther Aceticus.....	10-15-30 m.	Arsenii Iodid.....	$\frac{1}{4}$ - $\frac{1}{8}$ -1 gr.
Aloe.....	5-10-20 gr.	“ “ Max.....	$\frac{1}{2}$ -1 gr.
Aloinum.....	$\frac{1}{2}$ -2-3 gr.	Asafœtida.....	5-10-15 gr.
Alumen.....	10-15-60 gr.	Atropina }	$\frac{1}{16}$ - $\frac{1}{8}$ - $\frac{1}{4}$ gr.
Alumen Exsiccatum....	5-10-30 gr.	Atrop. Sulph. } Max.....	$\frac{1}{16}$ - $\frac{1}{8}$ - $\frac{1}{4}$ gr.
Ammon. Benzoas.....	10-15-30 gr.	Auri et Sod. Chlorid....	$\frac{1}{16}$ - $\frac{1}{8}$ - $\frac{1}{4}$ gr.
“ Bromid., Sedative....	10-20-30 gr.	“ “ Max.....	$\frac{1}{16}$ -1 gr.
“ “ Hypnotic.....	30-45-60 gr.	Bismuthi et Ammonii	
“ Carbonas.....	5-10-15 gr.	“ Citras.....	1-3-5 gr.
“ Chloridum.....	5-10-30 gr.	Bismuthi Subcarbonas..	10-30-60 gr.
“ Iodidum.....	3-5-10 gr.	“ Subiodidum....	10-15-30 gr.
“ Phosphas.....	10-15-30 gr.	“ Subnitras.....	10-30-60 gr.
“ Sulphoichthyolas	3-5-10 gr.	“ Tannas.....	10-15-30 gr.
“ Valerianas.....	2-5-8 gr.	Caffeina }	1-2-3 gr.
Amyl Nitris.....	2-3-5 m.	Caffeinæ Citras } Max...	3-5 gr.
Antifebrinum.....	3-5-15 gr.	Calcii Bromid., Sedative.	10-20-30 gr.
Antim. et Potass. Tart...	$\frac{1}{2}$ - $\frac{1}{4}$ - $\frac{1}{2}$ gr.	“ “ Hypnotic.....	30-45-60 gr.
“ “ Emetic.	1-2-3 gr.	Calcii Carbonas.....	10-30-60 gr.
Antimonii Oxidum.....	1-2-3 gr.	“ Hypophosphis....	5-15-30 gr.
“ Oxysulphuretum.	1-2-3 gr.	“ Phosphas.....	10-15-30 gr.
“ Sulphuratum.....	1-2-3 gr.	Calx Sulphurata.....	$\frac{1}{16}$ - $\frac{1}{8}$ - $\frac{1}{4}$ gr.
Antipyrinum.....	5-10-30 gr.	Cambogia.....	1-3-5 gr.
Apiol.....	2-3-5 m.	Camphora.....	1-5-10 gr.
Apomorph. Hydrochlor.	$\frac{1}{16}$ - $\frac{1}{8}$ - $\frac{1}{4}$ gr.	Camphora Monobro-	
“ “ Max.....	$\frac{1}{16}$ - $\frac{1}{8}$ - $\frac{1}{4}$ gr.	“ mata.....	1-3-5 gr.
Aqua Ammonia.....	10-15-30 m.	Cantharis.....	$\frac{1}{2}$ -1-2 gr.
“ Amygdalæ Amaræ	$\frac{1}{2}$ -1-2 fl. dr.	Capsicum.....	3-5-10 gr.
“ Anethi.....	$\frac{1}{2}$ -1 fl. oz.	Carbo Ligni.....	1-2-4 dr.
“ Anisi.....	$\frac{1}{2}$ -1 fl. oz.	Catechu.....	10-15-30 gr.
“ Aurantii Florum..	$\frac{1}{2}$ -1 fl. oz.	Cerii Oxalas.....	1-3-5 gr.
“ Camphoræ.....	$\frac{1}{2}$ -1 fl. oz.	Chloral.....	10-20-30 gr.
“ Capsici.....	$\frac{1}{2}$ -1 fl. oz.	“ “ Maximum.....	30-45 gr.
“ Carui.....	$\frac{1}{2}$ -1 fl. oz.	Chloral Butylicum.....	3-5-10 gr.

DRUG.	DOSE.
Chinoidinum.....	3-5-10 gr.
Chloroform.....	2-3-5 m. { 8-12-20 gtt.
Max. 5-10 m. {	20-40 gtt.
Cinchona.....	$\frac{1}{4}$ -1- $\frac{1}{2}$ dr.
Cinchonid. Sulph. {	Tonic 3-5-10 gr.
Cinchonin. Sulph. {	Antipyr. 10-20-30 gr.
Cocain. Hydrochlor.....	$\frac{1}{4}$ - $\frac{1}{2}$ -gr.
Max.	$\frac{1}{2}$ -1 gr.
Codeina.....	$\frac{1}{4}$ - $\frac{1}{2}$ -1 gr.
Codeinae Sulphas {	Max.....1-2-3 gr.
Confectio Piperis.....	1-2-3 dr.
Confectio Sennae.....	2-3-4 dr.
" Sulphuris.....	2-3-4 dr.
Copaiba.....	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
Creasotum.....	1-3-5 m.
Creta Præparata.....	10-30-60 gr.
Crotonchloral, see Chloral Butylicum.	
Cubeba.....	$\frac{1}{4}$ -1-3 dr.
Cupri Acetas.....	$\frac{1}{4}$ - $\frac{1}{2}$ gr.
Max.....	$\frac{1}{2}$ -1 gr.
Cupri Sulphas, Astringent	$\frac{1}{4}$ -1-2 gr.
" Emetic.....	5-10 gr.
Digitalinum.....	$\frac{1}{4}$ - $\frac{1}{2}$ - $\frac{1}{4}$ gr.
Max.....	$\frac{1}{4}$ - $\frac{1}{2}$ gr.
Digitalis.....	$\frac{1}{4}$ -1-2 gr.
Max.....	2-3 gr.
Elaterinum.....	$\frac{1}{32}$ - $\frac{1}{16}$ - $\frac{1}{8}$ gr.
Max.....	$\frac{1}{16}$ - $\frac{1}{8}$ gr.
Elatarium, (Clutterbuck's)	$\frac{1}{12}$ - $\frac{1}{6}$ - $\frac{1}{3}$ gr.
Max..	$\frac{1}{3}$ - $\frac{1}{2}$ gr.
Ergotinum, (Bonjean's).	3-5-10 gr.
Ext. Aconiti.....	$\frac{1}{4}$ - $\frac{1}{2}$ gr.
Max.....	$\frac{1}{2}$ -1 gr.
" Aloes Aquosum.	3-5-10-gr.
" Belladon. Alcoh.	$\frac{1}{4}$ - $\frac{1}{2}$ gr.
Max.	$\frac{1}{2}$ - $\frac{1}{4}$ gr.
" Buchu Fluidum.	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Cacti Grandiflori Fluidum.....	1-3-5 m.
" Cannab. Indic....	$\frac{1}{4}$ - $\frac{1}{2}$ gr.
Max.	$\frac{1}{2}$ -1 gr.
" Capsici Fluidum	$\frac{1}{2}$ -1-2 m.
" Castanea Fluid..	$\frac{1}{4}$ -1-2 fl. dr.
" Chimaphilæ Fl..	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.

DRUG.	DOSE.
Ext. Cimicifugæ Fl.....	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Cinchonæ.....	10-15-30 gr.
" Cinchonæ Fl.....	$\frac{1}{4}$ -1-2 fl. dr.
" Colchici Rad.....	$\frac{1}{4}$ - $\frac{1}{2}$ gr.
Max.	1-2-3 gr.
" Colocynth Comp.	5-15-30 gr.
" Conii Alcohol....	$\frac{1}{4}$ - $\frac{1}{2}$ gr.
Max.	1-2 gr.
" Conii B. P.....	$\frac{1}{4}$ -1-2 gr.
Max.	2-4-6 gr.
" Conii Fluidum...	1-3-5 m.
Max.	5-10 m.
" Convallariæ Fl...	3-5-10 m.
" Cubebæ Fluid...	10-15-30 m.
" Cypripedii Fl....	10-15-30 m.
" Digitalis.....	$\frac{1}{4}$ - $\frac{1}{2}$ gr.
Max...	$\frac{1}{2}$ -1 gr.
" Dulcamaræ Fl...	$\frac{1}{4}$ -1-2 fl. dr.
" Ergotæ.....	3-5-15 gr.
" Ergotæ Fluid....	$\frac{1}{4}$ -1-2 fl. dr.
Max.	2-4 fl. dr.
" Erythroxyli. Fl..	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
Max.	1-2 fl. dr.
" Eucalypti.....	10-15-30 m.
" Euonymi.....	1-3-5 gr.
" Euonymi Fluid.	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Eupatorii Fluid.	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Frangulæ Fluid.	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Gelsemii Fluid...	1-3-5 m.
" Gentianæ.....	3-5-15 gr.
" Gentianæ Fluid.	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Geranii Fluid....	$\frac{1}{4}$ -1-2 fl. dr.
" Glycyrrhizæ.....	$\frac{1}{4}$ - $\frac{1}{2}$ dr.
" Glycyrrhizæ Fl..	$\frac{1}{4}$ -1-2 fl. dr.
" Gossypii Fluid...	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
Max.	1-2 fl. dr.
" Granati Rad. Cort.	
Fluidum....	$\frac{1}{4}$ -1-2 fl. dr.
" Grindeliæ Fluid.	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Hæmatoxyli.....	5-10-30 gr.
" Hæmatoxyli Fl..	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Hamamelidis Fl.	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Helianthemii.....	5-10-15 m.
" Humuli Fluid....	10-30-60 m.
" Hydrastis Fluid.	$\frac{1}{4}$ -1-2 fl. dr.

DRUG.	DOSE.
Ext. Hyoscyami Alc.....	1-2-3 gr.
Max.	3-5 gr.
" Hyoscyami Fl....	3-5-10 m.
Max.	10-15 m.
" Ignatiæ.....	$\frac{1}{4}$ - $\frac{1}{2}$ gr.
Max.	$\frac{1}{2}$ -1 gr.
" Ipecac Fl. Expect.	3-5-10 m.
" Emetic.	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Iridis.....	1-3-5 gr.
" Iridis Fluidum...	5-10-20 m.
" Jalapæ (U. S. P., 1870).....	10-15-20 gr.
" Juglandis.....	5-15-30 gr.
" Juglandis Fluid.	$\frac{1}{2}$ -1-2 fl. dr.
" Krameriæ.....	5-10-20 gr.
" Krameriæ Fluid.	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Lappæ Fluidum.	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Leptandræ.....	1-3-5 gr.
" Leptandræ Fl....	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Lobeliæ Fl., Expect.	1-3-5 m.
" Emetic.	10-30 m.
" Lupulini Fluid...	10-15-30 m.
" Malti.....	2-4-8 dr.
" Matico Fluidum.	$\frac{1}{2}$ -1-2 fl. dr.
" Nucis Vomicae...	$\frac{1}{4}$ - $\frac{1}{2}$ gr.
Max.	1-2 gr.
" Opii.....	$\frac{1}{4}$ - $\frac{1}{2}$ gr.
Maximum..	1-1 $\frac{1}{2}$ gr.
" Pancreaticum....	3-5-10 gr.
" Pareiræ Fluidum	$\frac{1}{2}$ -1-2 fl. dr.
" Physostigmatis..	$\frac{1}{16}$ - $\frac{1}{8}$ - $\frac{1}{4}$ gr.
Max.	$\frac{1}{4}$ - $\frac{1}{2}$ gr.
" Phytolacæ Rad. Fl.	5-15-30 m.
" Pilocarpî Fluid..	10-15-30 m.
" Pimentæ Fluid... 10-15-30 m.	
" Podophylli.....	1-3-5 gr.
" Podophylli Fluid.	5-10-15 m.
" Pruni Virg. Fluid.	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
Max.	1-2 fl. dr.
" Quassiæ.....	1-2-3 gr.
" Quassiæ Fluidum.	5-10-30 m.
" Rhamni Purshianæ	1-3-5 gr.
" Rhamni Pursh. Fl.	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Rhei.....	5-10-15 gr.
" Rhei Fluidum...	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.

DRUG.	DOSE.
Ext. Rhois Glabræ Fl....	$\frac{1}{2}$ -1-2 fl. dr.
" Rosæ.....	$\frac{1}{2}$ -1-2 fl. dr.
" Sarsaparillæ Fl.	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Comp. Fl.	$\frac{1}{2}$ -1- $\frac{1}{2}$ fl. dr.
" Scoparii.....	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Scutellarisæ Fl....	$\frac{1}{2}$ -1-2 fl. dr.
" Senegæ Fluid....	3-5-15 m.
" Sennæ Fluidum.	1-2-4 fl. dr.
" Serpentariæ Fl...	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Spigeliæ.....	$\frac{1}{2}$ -1-2 fl. dr.
" Spigel. et Sennæ Fl.	2-3-4 fl. dr.
" Stillingiæ Fluid..	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Stramonii.....	$\frac{1}{4}$ - $\frac{1}{2}$ gr.
Max....	$\frac{1}{2}$ -1 gr.
" Sumbul.....	1-2-3 gr.
" " Fluidum..	15-30-60 m.
" Taraxaci.....	5-10-30 gr.
" Taraxaci Fluid...	1-2-3 fl. dr.
" Triticî Repent. Fl.	1-2-4 fl. dr.
" Ustilag. Mayd. Fl.	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Uvæ Ursi Fluid..	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Valerianæ Fluid.	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Viburni Prunif. Fl.	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Xanthoxyli Fl...	$\frac{1}{4}$ - $\frac{1}{2}$ fl. dr.
" Zingiberis Fl....	10-15-30 m.
Fel Bovinum Pur.....	3-5-10 gr.
Ferri Arsenias.....	$\frac{1}{4}$ - $\frac{1}{2}$ - $\frac{1}{4}$ gr.
Max.....	$\frac{1}{4}$ - $\frac{1}{2}$ gr.
" Bromidum.....	$\frac{1}{2}$ -1-2 gr.
" Citras.....	5-10-15 gr.
" et Ammon. Citras.	5-10-15 gr.
" " Sulph.	5-10-15 gr.
" " Tartr..	10-15-30 gr.
" " Potass. Tartr....	10-15-30 gr.
" " Quinina Citras..	3-5-10 gr.
" " Strychn. Citr....	1-2-3 gr.
Max.	3-5 gr.
" Hypophosphis.....	5-8-10 gr.
" Iodidum.....	1-3-5 gr.
" Lactas.....	1-3-5 gr.
" Oxalas.....	1-2-3 gr.
" Phosphas.....	5-8-10 gr.
" Pyrophosphas.....	2-3-5 gr.
" Subcarbonas.....	5-15-30 gr.
" Sulphas.....	1-3-5 gr.

DRUG.	DOSE.	DRUG.	DOSE.
Ferri Sulphas Exsic.....	$\frac{1}{2}$ -1-3 gr.	Liq. Potas. Arsenit.....	3-5-7 m.
" Valerianas.....	$\frac{1}{2}$ -1-2 gr.	Max.	7-10 m.
Ferrum Reductum.....	1-3-5 gr.	" Potas. Citrat.....	$\frac{1}{2}$ -1 fl. oz.
Glycerinum.....	1-2-3 fl. dr.	" Sod. Arseniat.....	3-5-7 m.
Glycyrrhizin. Ammon...	5-10-15 gr.	Max.	7-10 m.
Hydrarg. Chlor. Corr....	$\frac{1}{2}$ - $\frac{1}{4}$ - $\frac{1}{8}$ g.	Lithii Benzoas.....	10-15-30 gr.
Max.	$\frac{1}{2}$ - $\frac{1}{4}$ gr.	" Bromidum.....	5-10-30 gr.
" Chlor. Mite, Alt.	1-2-3 gr.	" Carbonas.....	3-5-15 gr.
Purg.	5-10-15 gr.	" Citras.....	10-15-30 gr.
" Cyanid.....	$\frac{1}{2}$ - $\frac{1}{4}$ - $\frac{1}{8}$ gr.	" Salicylas.....	10-15-30 gr.
Max.....	$\frac{1}{2}$ - $\frac{1}{4}$ gr.	Lupulinum.....	5-10-15 gr.
" Iodid. Rub.....	$\frac{1}{2}$ - $\frac{1}{4}$ - $\frac{1}{8}$ gr.	Magnesia ponderosa.....	$\frac{1}{2}$ -2-2 $\frac{1}{2}$ dr.
Max.	$\frac{1}{2}$ - $\frac{1}{4}$ gr.	Magnesii Carbonas.....	1-2-3 dr.
" Iodid. Vir.....	$\frac{1}{2}$ - $\frac{1}{4}$ -1 gr.	Magnesii Sulphas.....	$\frac{1}{2}$ -1- $\frac{1}{2}$ oz.
Max.	1-2-3 gr.	Magnesii Sulphis.....	10-15-30 gr.
" Subsulph. Fla., Alt.	$\frac{1}{2}$ - $\frac{1}{4}$ - $\frac{1}{8}$ gr.	Mangani Oxidum Nigr..	3-5-15 gr.
Emet.	2-5 gr.	" Sulphas.....	5-10-15 gr.
Hydrargyrum cum Creta.	3-5-10 gr.	Massa Copaibæ.....	5-15-30 gr.
Hydrochinonum.....	5-10-15 gr.	" Ferri Carbonat...	3-5-7 gr.
Hyoscyaminæ Sulph.....	$\frac{1}{4}$ - $\frac{1}{8}$ - $\frac{1}{16}$ gr.	" Hydrargyri.....	3-5-10 gr.
Max.	$\frac{1}{2}$ - $\frac{1}{4}$ - $\frac{1}{8}$ gr.	Menthol.....	1-3-5 gr.
Hyoscine Hydrobrom.....	$\frac{1}{16}$ - $\frac{1}{8}$ - $\frac{1}{4}$ gr.	Mist. Ammoniaci.....	$\frac{1}{2}$ -1 fl. oz.
Max.	$\frac{1}{4}$ - $\frac{1}{8}$ gr.	" Asafetide.....	$\frac{1}{2}$ -1 fl. oz.
Ichthyol, (See Ammonii or		" Cretæ.....	$\frac{1}{2}$ -1 fl. oz.
Sodii Sulphoichthyol.)		" Ferri Composita...	$\frac{1}{2}$ -1-2 fl. oz.
Infus. Digitalis.....	2-3-4 fl. dr.	" Ferri et Ammon.	
Max.....	4-8 fl. dr.	Acet.....	$\frac{1}{2}$ -1 fl. oz.
Infus. Lulpuli, B. P.....	1-2-4 fl. oz.	" Glycyrrh. Comp...	2-4-6 fl. dr.
Iodoformum.....	$\frac{1}{2}$ -1-3 gr.	" Magnesie et Asaf.	
Iodolum.....	$\frac{1}{2}$ -1-3 gr.	(for children)...	10-15-30 m.
Ipecacuanha, Expect....	$\frac{1}{2}$ -1-2 gr.	" Potass. Citratis.....	$\frac{1}{2}$ -1 fl. oz.
Emetic.....	10-20-30 gr.	" Rhei et Sodæ.....	$\frac{1}{2}$ -1-2 fl. dr.
Jalapa.....	10-15-30 gr.	Morphinæ Acetas.....	$\frac{1}{2}$ - $\frac{1}{4}$ gr.
Kaïrina.....	3-5-15 gr.	Max.....	$\frac{1}{2}$ - $\frac{1}{4}$ gr.
Liq. Ammon. Acet.....	$\frac{1}{2}$ -1 fl. oz.	" Hydrochlor. } ...	$\frac{1}{2}$ - $\frac{1}{4}$ gr.
" Acidi Arseniosi..	3-5-7 m.	" Sulphas } Max.	$\frac{1}{2}$ - $\frac{1}{4}$ gr.
Max.	7-10 m.	Naphthalinum.....	3-5-10 gr.
" Ars. et Hydrarg. Iod.	3-5-10 m.	Nitroglycerinum.....	$\frac{1}{2}$ -1-3 m. =
Max.	10-15 m.	(1% solution).....	1-2-6 gtt.
" Calcis.....	$\frac{1}{2}$ -1-4 fl. oz.	Max.....	3-5 m.
" Ferri Chloridi...	3-5-10 m.	Oleoresina Aspidii.....	$\frac{1}{2}$ -1 fl. dr.
" " Dialysat..	10-15-30 m.	" Capsici.....	$\frac{1}{2}$ -1 m.
" " Nitratis...	5-10-15 m.	" Cubebæ.....	5-15-30 m.
" Pepsini.....	$\frac{1}{2}$ -1 fl. oz.	" Lupulini.....	3-5-7 m.
" Potasse.....	10-15-30 m.	" Piperis.....	$\frac{1}{2}$ -1-2 m.

DRUG.	DOSE.	DRUG.	DOSE.
Oleoresina Zingiberis....	$\frac{1}{2}$ -1-2 m.	Piper Nigrum.....	5-10-20 gr.
Oleum Chenopodii.....	3-5-10 m.	Piperina.....	1-5-10 gr.
“ Copaibæ.....	5-10-15 m.	Plumbi Acetas { Astring.	1-2-3 gr.
“ Cubebæ.....	5-10-15 m.	{ Hamostat.	3-4-5 gr.
“ Erigerontis.....	5-10-30 m.	“ Iodidum.....	$\frac{1}{2}$ - $\frac{1}{2}$ -1 gr.
“ Eucalypti.....	5-10-15 m.	“ Nitras.....	$\frac{1}{2}$ - $\frac{1}{2}$ - $\frac{1}{2}$ gr.
“ Gaultheriæ.....	5-15-30 m.	Potassa Sulphurata.....	3-5-10 gr.
“ Juniperi.....	5-10-15 m.	Potass. Acetas.....	10-30-60 gr.
“ Menthæ Pip.....	1-3-5 m.	“ Bicarbonas.....	10-30-60 gr.
“ Menthæ Vir.....	1-3-5 m.	“ Bitartr., Aper...	1-1 $\frac{1}{2}$ -2 dr.
“ Morrhuæ.....	$\frac{1}{2}$ - $\frac{1}{2}$ -1 fl. oz.	“ Purgat.	4-6-8 dr.
“ Phosphoratum.	1-2-3 m.	“ Brom., Sedative	10-20-30 gr.
Max.	3-5 m.	“ Hypnotic	30-45-60 gr.
“ Ricini.....	$\frac{1}{2}$ -1- $\frac{1}{2}$ fl. oz.	“ Carbonas.....	10-20-30 gr.
“ Sabinæ.....	1-3-5 m.	“ Chloras.....	5-10-20 gr.
“ Santali.....	10-15-30 m.	“ Citras.....	15-30-60 gr.
“ Succini.....	5-10-15 m.	“ Cyanid.....	$\frac{1}{2}$ - $\frac{1}{2}$ - $\frac{1}{2}$ gr.
“ Terebin.. { Stim.	5-10-30 m.	Max.....	$\frac{1}{2}$ - $\frac{1}{2}$ gr.
{ Anthel.	2-3-4 fl. dr.	“ et Sod. Tartr. { Aper.	1-1 $\frac{1}{2}$ -2 dr.
“ Tiglii.....	$\frac{1}{2}$ -1-2 m.	{ Purg.	$\frac{1}{2}$ - $\frac{1}{2}$ -1 oz.
Paraldehydum.....	$\frac{1}{2}$ - $\frac{1}{2}$ -1 fl. dr.	“ Ferrocyanidum	10-15-30 gr.
Max....	1-2 fl. dr.	“ Hypophosphis.	5-15-30 gr.
Pepsinum (scale).....	3-5-10 gr.	“ Iodid., Alter....	5-10-15 gr.
Pepsinum Saccharatum	15-30-60 gr.	“ Antisyph...	15-30-60 gr.
Picrotoxinum.....	$\frac{1}{16}$ - $\frac{1}{16}$ - $\frac{1}{8}$ gr.	“ Nitras.....	10-15-30 gr.
Max.....	$\frac{1}{16}$ - $\frac{1}{16}$ gr.	“ Permanganas..	$\frac{1}{2}$ -1-3 gr.
Pilocarpinæ Hydrochlor.	$\frac{1}{2}$ - $\frac{1}{2}$ - $\frac{1}{2}$ gr.	“ Sulphas, Aper.	15-30-60 gr.
Max.	$\frac{1}{2}$ - $\frac{1}{2}$ gr.	Purg.	2-3-5 dr.
Pil. Aloes.....	2-3-5 p.	“ Sulphis.....	15-30-60 gr.
“ Aloes et Asafetidæ..	2-3-5 p.	“ Tartras.....	$\frac{1}{2}$ - $\frac{1}{2}$ -1 oz.
“ “ “ Ferri.....	1-2-3 p.	Pulvis Antimonialis.....	3-5-10 gr.
“ “ “ Mastiches..	2-3-5 p.	“ Cretæ Comp.....	15-30-60 gr.
“ “ “ Myrrhæ.....	2-3-5 p.	“ Glycyrrh. Comp.	$\frac{1}{2}$ -1-2 dr.
“ Antimonii Comp...	1-2-3 p.	“ Ipecac. et Opii...	5-10-15 gr.
“ Asafetidæ.....	2-3-5 p.	“ Jalapæ Comp....	$\frac{1}{2}$ - $\frac{1}{2}$ -1 dr.
“ Catharticæ Comp...	2-3-5 p.	“ Opii.....	$\frac{1}{2}$ -1-2 gr.
“ Ferri Compositæ...	2-3-5 p.	Maximum..	2-3 gr.
“ Ferri Iodidi.....	2-3-5 p.	“ Rhei Comp.....	1-2-3 dr.
“ Galbani Compositæ	2-3-5 p.	Quinidinsæ Hydro-	
“ Opii (1 gr.).....	1-2 p.	chlor.	
Max.....	2-3 p.	“ Sulphas	Tonic..... 1-3-5 gr. Antipyret. 10-15-30 gr.
“ Phosphori.....	1-2-3 p.	Quininsæ Bisulph.	
Max.....	3-5 p.	Hydro-	
“ Rhei.....	2-3-5 p.	chlor.	
“ Rhei Compositæ....	2-3-5 p.	“ Sulphas	
		“ Valerianas.....	1-2-3 gr.

DRUG.	DOSE.	DRUG.	DOSE.
Resina Copaibæ.....	5-10-20 gr.	Sparteinae Sulphas.....	$\frac{1}{2}$ - $\frac{1}{2}$ gr.
“ Jalapæ.....	1-3-5 gr.	Spir. Ætheris Comp.....	$\frac{1}{2}$ - $\frac{1}{2}$ fl. dr.
“ Podophylli.....	$\frac{1}{2}$ - $\frac{1}{2}$ gr.	“ Æther. Nit., { Febrif. $\frac{1}{2}$ - $\frac{1}{2}$ fl. dr.	
Max, 1-2 gr.		“ { Diuret. 1- $\frac{1}{2}$ -2 fl. dr.	
Resorcinum.....	8-5-15 gr.	“ Ammon. Arom.....	$\frac{1}{2}$ - $\frac{1}{2}$ fl. dr.
Rheum.....	5-15-30 gr.	“ Camphoræ.....	5-15-30 m.
Salicinum.....	10-15-30 gr.	“ Chloroformi.....	10-30-60 m.
Salol.....	8-5-15 gr.	“ Gaultheriæ.....	10-15-30 m.
Santonica.....	10-30-60 gr.	“ Juniperi.....	15-30-60 m.
Santoninum.....	1-2-3 gr.	“ Juniperi Comp.....	1-2-4 fl. dr.
Sapo.....	5-15-30 gr.	“ Lavandulæ.....	15-30-60 m.
Scilla.....	1-2-3 gr.	“ Mentha Piperitæ.....	5-10-20 m.
Senna.....	$\frac{1}{2}$ -1-2 dr.	“ “ Viridis.....	5-10-20 m.
Sinapis, (Emetic).....	1-2-4 dr.	Strychnina.....	$\frac{1}{4}$ - $\frac{1}{4}$ - $\frac{1}{4}$ gr.
Sodii Acetas.....	15-30-60 gr.	Maximum.....	$\frac{1}{4}$ - $\frac{1}{4}$ - $\frac{1}{4}$ gr.
“ Arsenias.....	$\frac{1}{4}$ - $\frac{1}{4}$ - $\frac{1}{4}$ gr.	Strychn. Sulph.....	$\frac{1}{4}$ - $\frac{1}{4}$ - $\frac{1}{4}$ gr.
Max.....	$\frac{1}{2}$ - $\frac{1}{2}$ gr.	Max ..	$\frac{1}{8}$ - $\frac{1}{8}$ - $\frac{1}{8}$ gr.
“ Benzoas.....	15-30-60 gr.	Sulphur Lotum.....	1-2-3 dr.
“ Bicarbonas.....	10-30-60 gr.	“ Præcipitatum...	1-2-3 dr.
“ Bisulphis.....	10-15-30 gr.	“ Sublimatum.....	1-2-3 dr.
“ Boras.....	10-15-30 gr.	Syrup. Acidi Citrici.....	$\frac{1}{2}$ - $\frac{1}{2}$ fl. oz.
“ Bromid., Sedative. 10-20-30 gr.		“ Allii.....	1-2-3 fl. dr.
“ Hypnotic 30-45-60 gr.		“ Aurantii.....	$\frac{1}{2}$ - $\frac{1}{2}$ fl. oz.
“ Carbonas.....	10-15-30 gr.	“ Calcii Lactophos...	2-3-4 fl. dr.
“ Carbonas Exsicc... 5-10-15 gr.		“ Ferri Iodidi.....	10-30-60 m.
“ Chloras.....	5-10-20 gr.	“ Ferri Quin. et } $\frac{1}{2}$ -1- $\frac{1}{2}$ fl. dr.	
“ Chloridum.....	10-30-60 gr.	“ Strych. Phos... }	
“ Choleas.....	8-5-15 gr.	“ Hypophosph. Com. 2-3-4 fl. dr.	
“ Hypophosphis 5-10-30 gr.		“ Ipecac, Expect.... 5-15-30 m.	
“ Hyposulphis.....	10-15-20 gr.	Emetic 2-4-6 fl. dr.	
“ Iodid., Alterative.. 5-10-15 gr.		“ Krameriæ.....	2-4-6 fl. dr.
“ Antisyphil. 15-30-60 gr.		“ Lactucarii.....	$\frac{1}{2}$ -1-2 fl. dr.
“ Nitris.....	1-2-3 gr.	“ Pruni Virginianæ 2-4-6 fl. dr.	
“ Phosphas, Laxative 1-2-4 dr.		“ Rhei.....	2-4-6 fl. dr.
“ Purgative 4-6-8 dr.		“ Rhei Aromaticus 2-4-6 fl. dr.	
“ Phosph. Exsic., Lax. $\frac{1}{2}$ -1-2 dr.		“ Rubi.....	1-2-3 fl. dr.
“ Purg. 2-3-4 dr.		“ Sarsaparil. Comp. 2-4-6 fl. dr.	
“ Salicylas.....	10-30-60 gr.	“ Scillæ.....	$\frac{1}{2}$ - $\frac{1}{2}$ -1 fl. dr.
“ Sulphas..... { Aper. 1-2-3 dr.		“ Scillæ Comp.....	$\frac{1}{2}$ - $\frac{1}{2}$ fl. dr.
“ { Purg. $\frac{1}{2}$ - $\frac{1}{2}$ oz.		“ Senegæ.....	$\frac{1}{2}$ - $\frac{1}{2}$ fl. dr.
“ Sulphas Exsicc { Aper. $\frac{1}{2}$ -1- $\frac{1}{2}$ dr.		“ Sennæ.....	1-2-4 fl. dr.
“ { Purg. 2-3-4 dr.		“ Tolutanus.....	2-4-6 fl. dr.
“ Sulphis.....	10-30-60 gr.	“ Zingiberis.....	2-4-6 fl. dr.
“ Sulphocarbolas.....	10-15-30 gr.	Terebenum.....	5-10-15 m.
“ Sulphoichthyolas.. 8 5-10 gr.		Thallinum.....	3-5-10 gr.

DRUG.	DOSE.	DRUG.	DOSE.
Theina }	1-2-3 gr.	Tinct. Ipecac. et Opii ...	5-10-15 m.
Theinæ Citras } Max...	3-5 gr.	" Jalapæ.....	$\frac{1}{2}$ -1-2 fl. dr.
Thymol.....	3-5-10 gr.	" Kino.....	$\frac{1}{2}$ -1-3 fl. dr.
Tinct. Aconiti.....	1-2-3 m.	" Krameriæ.....	$\frac{1}{2}$ -1-3 fl. dr.
Max.....	3-5 m.	" Lavandulæ Comp	$\frac{1}{2}$ -1-2 fl. dr.
Tinct. Aloes.....	$\frac{1}{2}$ -2-4 fl. dr.	" Lobeliæ Expect...	10-30-60 m.
" Aloes et Myrrhæ.	$\frac{1}{2}$ -1-2 fl. dr.	Emet. (Asth.)	1-2 fl. dr.
" Asafetidæ.....	$\frac{1}{2}$ -1- $\frac{1}{2}$ fl. dr.	" Lupulinæ.....	$\frac{1}{2}$ -1-2 fl. dr.
" Belladonnæ.....	5-10-15 m.	" Matico.....	$\frac{1}{2}$ -1-2 fl. dr.
Max.	15-20 m.	" Myrrhæ.....	15-30-60 m.
" Benzoini.....	10-15-30 m.	" Nucis Vomica....	5-10-20 m.
" Benzoini Comp...	15-30-60 m.	Max.	20-30 m.
" Calumbæ.....	1-2-4 fl. dr.	" Opii.....	5-10-15 m.
" Cannab. Indic....	10-15-30 m.	Max.....	15-30 m.
Max.	30-60 m.	" Opii Acet.....	5-10-15 m.
" Cantharidis.....	3-5-10 m.	Max....	15-30 m.
" Capsici.....	10-30-60 m.	" Opii Camphor....	1-2-4 fl. dr.
" Cardamomi Comp	1-2-3 fl. dr.	" " Deodor.....	5-10-15 m.
" Catechu Comp...	$\frac{1}{2}$ -1-3 fl. dr.	Max.	15-30 m.
" Chiratzæ.....	$\frac{1}{2}$ -1-2 fl. dr.	" Physostigmatis ...	10-15-30 m.
" Cimicifugæ.....	1-2-4 fl. dr.	" Quassia.....	$\frac{1}{2}$ - $\frac{1}{4}$ -1 fl. dr.
" Cinchonæ.....	1-2-3 fl. dr.	" Rhei.....	1-2-4 fl. dr.
" Cinchonæ Comp..	1-2-4 fl. dr.	" Rhei Aromatica..	$\frac{1}{2}$ -1- $\frac{3}{4}$ fl. dr.
" Colchici Rad.....	5-15-30 m.	" Rhei Dulcis.....	1-2-4 fl. dr.
Max.	30-60 m.	" Sanguinar., Alter.	10-15-30 m.
" Colchici (sem.)....	10-30-60 m.	" " Emet.	1-2-4 fl. dr.
Max.	1- $\frac{1}{2}$ -2 fl. dr.	" Scillæ.....	5-10-20 m.
" Conii.....	15-30-60 m.	" Senegæ.....	$\frac{1}{2}$ -1-2 fl. dr.
" Cubebæ.....	$\frac{1}{2}$ -1-2 fl. dr.	" Serpentariæ.....	1-2-4 fl. dr.
" Digitalis.....	5-15-30 m.	" Stramonii.....	10-15-20 m.
Max.....	30-60 m.	Max...	20-30 m.
" Ferri Acetatis....	10-30-60 m.	" Strophanthi.....	3-5-10 m.
" Ferri Chloridi....	5-10-20 m.	Max.	10-15 m.
" Gallæ.....	$\frac{1}{2}$ -1-2 fl. dr.	" Sumbul.....	$\frac{1}{2}$ - $\frac{1}{4}$ -1 fl. dr.
" Gelsemii.....	5-10-20 m.	" Valerianæ.....	1-2-4 fl. dr.
" Gentianæ Comp..	1-2-4 fl. dr.	" Valerian. Am-	
" Guaiaci.....	$\frac{1}{2}$ -1-2 fl. dr.	mon.....	$\frac{1}{2}$ - $\frac{1}{4}$ -1 fl. dr.
" Guaiaci Ammon.	$\frac{1}{2}$ -1-2 fl. dr.	" Veratri Virid....	1-3-5 m.
" Hellebori.....	15-30-60 m.	Max.	5-8 m.
" Humuli.....	1-2-3 fl. dr.	" Zingiberis.....	$\frac{1}{2}$ -1-2 fl. dr.
" Hydrastis.....	$\frac{1}{2}$ - $\frac{1}{4}$ -1 fl. dr.	Veratrina.....	$\frac{1}{2}$ - $\frac{1}{4}$ - $\frac{1}{2}$ gr.
" Hyoscyami.....	10-30-60 m.	Max.....	$\frac{1}{2}$ - $\frac{1}{4}$ gr.
Max...	1-2 fl. dr.	Vin. Aloes.....	1-2-4 fl. dr.
" Ignatiæ.....	5-10-15 m.	" Antimonii, Expect.	10-15-30 m.
Max.....	15-20 m.	" " Emetic	$\frac{1}{2}$ -1-2 fl. dr.

DRUG.	DOSE.	DRUG.	DOSE.
Vin. Colchici Rad.....	5-15-30 m.	Vin. Rhei.....	1-2-4 fl. dr.
Max.	30-60 m.	Zinci Bromidum.....	$\frac{1}{2}$ -1-2 gr.
" Colchici Sem.....	10-30-60 m.	" Oxidum.....	1-3-5 gr.
Max.	1-1 $\frac{1}{2}$ -2 fl. dr.	" Phosphidum.....	$\frac{1}{4}$ - $\frac{1}{2}$ - $\frac{1}{2}$ gr.
" Ergotæ.....	1-2-4 fl. dr.	Max.	$\frac{1}{2}$ - $\frac{1}{2}$ gr.
" Ferri Amarum.....	2-3-4 fl. dr.	" Sulphas, Astringent	1-2-3 gr.
" Ipecacuanhæ.....	5-15-30 m.	" Emetic...	10-30-60 gr.
" Opii.....	5-10-15 m.	" Valerianas.....	$\frac{1}{2}$ -1-2 gr.
Max.....	15-30 m.		

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MORREK, PH. G.

Test for Saccharin.—The suspected substance is extracted from acidulated solution with ether, the residue after the evaporation of the solvent is heated in a test tube with thrice its bulk of resorcin and a few drops of concentrated H_2SO_4 . The fluid changes to yellow, red, dark green and then effervesces, through liberation of SO_2 ; the fluid is allowed to boil up several times and then set aside to cool. Extracted with water containing a little NaOH, the solution if saccharin was present, presents a pale rose tint by transmitted light, by reflected light a beautiful moss-green fluorescence. 0.001 gm. in 5 to 6 litres of water can be distinctly detected.—*Boernstein in Ztschr. f. Anal. Chem.*, 1888, 167.

Mel Depuratum.—Becker recommends 5 lbs. crude honey, 3 lbs. distilled water and 2 lbs. alcohol to be mixed, allowed to stand a few days, filtered, the alcohol distilled off and the residue evaporated. The product indefinitely preserves its light color.—*Pharm. Zig.*, 1888, 313.

Detection of Salicylic Acid in Beverages and Foods.—Dr. Ripper offers the following, based on the solubility of the acid in a mixture of equal volumes of ether and petroleum-ether, in which extractive and tannin are almost insoluble. 50 cc. of the liquid, or if a solid a definite quantity mixed with water, are acidulated with 5 cc. of dilute H_2SO_4 , and agitated with 50 cc. mixed ether and petroleum-ether in a separating funnel; should the liquids not separate readily, addition of a little alcohol will assist. The ethereal solution is removed and agitated with 50 cc. of ether-saturated water, to extract acetic acid which is

present especially in beverages, the ethereal layer filtered, the solvent evaporated and the residue dissolved in 20 cc. water. If a qualitative test is all that is required, a drop of Fe_2Cl_6 is added; for a quantitative test, a few drops of phenol-phthalein solution are added and the liquid titrated with $\frac{1}{2}$ normal KOH.—*Pharm. Ztg.*, 1888, 317.

Hyoscyamine and Atropine.—A communication of the "Chemische Fabrik auf Actien," (formerly E. Schering,) to *Pharm. Ztg.*, 1888, 333, details results of the change of hyoscyamine into atropine. Attention was first attracted by the same lot of belladonna root, yielding varying mixtures of the two alkaloids or only atropine. Later experiments proved that by suitable methods, either alkaloid could be gotten in the pure state; that belladonna as well as hyoscyamus contains only hyoscyamine preformed; and that atropine is merely a molecularly re-arranged hyoscyamine. Atropine is formed by heating hyoscyamine at 110°C . for some time (this change was announced by E. Schmidt in *Pharm. Ztg.*, 1887, 542, almost a year previous to the above publication); on a large scale it may be obtained by treatment of hyoscyamine with alkalis, and by a number of other methods.

Thio-resorcin, a substitute for iodoform, is a sulphur derivative of resorcin made by the action of S upon the alkaline salts of resorcin. A yellowish inodorous powder, insoluble in water, difficultly so in alcohol but easily soluble in dilute alkalis.—*Rundschau*, 1888, 314.

Menthiodol, a new remedy for neuralgia, appears in the market in cones made by carefully melting 4 parts menthol and adding 1 part iodol. Should the mass be too brittle, a little camphor is advantageously added.—*Rundschau*, 1888, 315.

Carbonated Milk, used in dyspepsia, lung troubles, etc., as a substitute for kefir and koumys, is made by charging in a soda water apparatus fresh milk with 2 or $2\frac{1}{2}$ volumes of CO_2 . To render it more palatable 1.5—1 gm. NaCl and 0.5 NaHCO_3 are added to each quart; these additions also prevent change for a time.—*Palm*, in *Rundschau*, 1888, 376.

Cichory in Coffee.—Karz suggests the determination of chlorine as the means of establishing the purity of coffee. Coffee contains 0.03 per cent., cichory 0.28 per cent. of chlorine. 25 gms. should be used for incineration and the ash examined volumetrically with silver nitrate.—*Rundschau*, 1888, 390.

Chlorinated Lime will, according to Pattinson, loose its available

chlorine after some time, regardless of the precautions taken to preserve it. The hypochlorite gradually forms chloride and chlorate of calcium.—*Rundschau*, 1888, 452.

Antineuralgic Ointment.—Menthol 75, cocaine 25, chloralhydrate 15, petrolatum 500.—*Rundschau*, 1888, 453.

Sulpho-benzoate of Sodium is made by Heckel, by dissolving benzoic acid in a concentrated solution of sodium sulphite (molecular ratio 122-252. It is easily soluble in water, is used as an antiseptic dressing for wounds in the strength of 4 to 5 gm. in litre, is more active than phenol and belongs in the same class as mercuric chloride and iodoform without the objectionable properties of these. (See also AM. JOUR. PHARM., March, 1888, p. 136.)

Conversion of Camphor into Borneol and of Menthon into Menthol. The process patented in Germany by E. Beckmann, consists in dissolving camphor (or menthon or oil of peppermint), in a solvent indifferent to metallic sodium, with which the solution is repeatedly treated. The following expresses the change with camphor :



Camphor. Camphor Sodium. Borneol Sodium.

These compounds are decomposed by water and the mixture of camphor and borneol again treated with Na, until the camphor is completely changed into Borneol.—*Chemiker Zig.*, 1888, 566. *Berichte*, Ref., 321.

Oil of Eucalyptus globulus.—R. Voiry found the oil to yield : 1, an aqueous distillate containing formic and chiefly acetic acids ; 2, butyr- and valer-aldehydes ; 3, a dextrogyre terpene boiling at 158 to 160° C., sp. gr. 0.88 at 0° C. ; yielding a monochlorhydrate $\text{C}_{10}\text{H}_{17}\text{Cl}$ melting at 126°–128° C. ; 4, eucalyptol (in the fractions between 170°–175° C. representing two-thirds of the oil) ; by cooling distillate by ice and salt and allowing crystals to drain and repeating the crystallization in the same manner several times, eucalyptol was obtained perfectly pure, as a mobile liquid, crystallizing at 0° C., melting at 1° C. ; density at 0° C., 0.940 ; odor resembling mint and camphor ; formula, $\text{C}_{10}\text{H}_{18}\text{O}$; optically inactive and yielding $2 \text{C}_{10}\text{H}_{18}\text{O} \cdot \text{HCl}$ with dry HCl at low temperature.

By distillation under reduced pressure (0.04 m.) a terpenol was obtained at 130°–135° C. ; this forms a dichlorhydrate $\text{C}_{10}\text{H}_{16}\text{2HCl}$. At 140°–145° C., the esters of acetic, butyric and valerianic acids of this terpenol were gotten. Other distillation products were poly-

mers of $C_{10}H_{16}$ mixed with resinous bodies. A sulphurated compound is present in the oil, which, however, decomposes on warming with a solution of H_2S .—*Chem. Ztg. Rpt.*, 1888, 101.

A *hektograph mass* which prevents aniline inks from penetrating into the interior and which allows the ink to be removed simply by washing is made as follows: Isinglass 100, glycerin 600 and water 400.—*Pharm. Centrhl.*, 1888, 228.

Detection of Ceresin in Wax.—0.2 gm. of the sample is liquefied in a test tube and dissolved by gentle agitation in 5 gm. chloroform, corked and set aside until a temperature of 16° – 18° C. is attained. Should ceresin be present a turbid, whitish layer is produced, varying in depth according to amount of adulteration.—H. Hager, *Pharm. Centrhl.*, 1888, 242.

Extracts of Aconite.—A summary of alkaloidal determinations of aconite extracts made according to the various pharmacopœias by Richard Kordes concludes his contributions in the *Pharm. Zschr. f. Russl.*, 1888, p. 340. The extracts were made from the same lot of drug, the determination by volumetric estimation with Mayer's reagent. The menstrua were examined and if they precipitated the test solution, the amount of this was deducted from total precipitation.

LEAVES.

AUTHORITY.	Yield of Extr. from drug.	Solid matter in Extr.	Percentage of alkaloid calculated for			Percentage of extracted alkaloid.
			Normal Extract.	Dry Extr.	Drug.	
Fol. Aconiti.....	.....	.....	.....	.....	0.3832	100.0
Ext. Gall. (aquis.)..	45.3%	70.3%	0.49064	0.6979	0.22220	58.0
“ Ross. (aq. sp.)..	9.6	71.8	1.98080	2.7568	9.19015	49.6
“ Fennic (spr.)..	18.2	76.5	2.05680	2.6880	0.37430	97.6
“ Helv. “ ..	20.0	76.8	1.85860	2.4000	0.37170	96.9
“ Internat. “ ..	26.0	74.9	1.45680	1.9450	0.37870	98.8
“ Rossic. (sicc.)..	19.2	100.0	0.88070	0.8807	.....	.....
“ Fennic. “ ..	54.6	100.0	0.54830	0.5483	.....	.....

ROOT.

Rad. Aconit.....	.....	.....	.....	.....	0.7901	100.0
Ext. Austr.....	28.0	62.3	2.1694	3.4820	0.6074	76.8
“ Ger.....	31.6	57.6	2.1114	3.6620	0.6672	84.4
“ Ross.....	27.4	65.7	2.5559	3.8902	0.7003	88.6
“ U. S.....	17.5	.....	5.4570	.....	0.7605	96.2
“ Dieterich.....	36.0	68.3	1.8208	2.6666	0.6555	82.9
“ Internat.....	40.0	66.2	1.8348	2.7695	0.7336	92.8
“ U. S. Fluid.....	86.6	11.1	0.9066	8.1580	0.7851	99.3

Grains of Paradise in Pepper.—The detection is based on the former containing tannin from which both black and white pepper are free. The tannin is extracted with a mixture of two parts alcohol and one part ether, and after maceration, separation, and evaporation of the solvents, the addition of F_2Cl_6 produces green color.—*Ztschr. f. Nahrungsm. Unters.* 1888, p. 88.

To prevent Mould in solutions of Gum.—Hirschberg (*Pharm. Post*, 1888, p. 394), recommends the addition of a few drops of sulphuric acid which precipitates the lime as calcium sulphate, after the deposition of which the clear solution is decanted or strained. This solution shows no tendency to become mouldy even after standing eighteen months.

Sodium Salicylate in Tooth-ache.—Dr. G. Hofmann has used this salt successfully in half-hourly doses of 0.75 gm. It does not always afford a permanent cure, but will give relief for one or more days.—*Pharm. Ztschr. f. Russl.* 1888, p. 366.

Detection of Acetanilid (Antifebrin) in Phenacetin.—This latter compound used to a considerable extent in Europe, owing to its similarity to the acetanilid is liable to adulteration with this, the prices of the two favoring this. E. Mylius proposes the following as a test to indicate traces of acetanilid in phenacetin: 0.1 gm. phenacetin is warmed with 2 cc. solution of soda over a Bunsen burner; after addition of three or four drops of chloroform the mixture is again warmed when, if acetanilid is present, the characteristic offensive odor of isonitril is evolved. Phenacetin itself gives rise to a rather pleasant aromatic odor.—*Pharm. Zig.*, 1888, p. 359.

English Smelling Salts consist almost exclusively of ammonium carbonate, leaving only a slight residue, on evaporation, of ammonium bi-carbonate. A superior product can be made by very carefully subliming the commercial carbonate, so that only the carbamate is volatilized.—*E. Mylius, Pharm. Zig.*, 1888, p. 359.

Codeine is recommended by Dr. Lauder Brunton (*Brit. Med. Jour.*, June 2, 1888), in pain affecting the intestine and lower part of the abdomen. He advises $\frac{1}{2}$ grain three times a day, and increases the dose to a grain if the patient is not relieved; it does not cause drowsiness nor does it interfere with the digestive functions. In long continued enteralgia, not due to organic disease, it has continued to relieve pain for months together.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for THE AMERICAN JOURNAL OF PHARMACY.

ACID SOLUTIONS OF CORROSIVE SUBLIMATE.—Dr. Laplace (*Gaz. degli Osp.*) states that ordinary solutions of corrosive sublimate are inefficacious for fabrics used in surgical dressings, on account of the tendency to form mercuricalbuminate; this is prevented by acidulating the solution. He also says that the antiseptic power of sublimate solutions is increased by such additions, so that weaker mixtures may be used with equally good effect. He thinks that where acids are thus used there is no need of iodoform. For lotions he recommends: Corrosive sublimate, 1 gm.; tartaric acid, 5 gm.; distilled water, 1000 gm. A solution in which to immerse gauze, bandages, etc., is composed of: sublimate, 5 gm.; tartaric acid, 20 gm.; distilled water, 1000 gm.—*Nouv. Rem.*, May 24, 1888. See also *AM. JOUR. PHAR.* 1887 p. 355.

INCOMPATIBILITY OF CHLORATE OF POTASSIUM AND IODIDE OF IRON.—According to the *Boll. Farm. (Arch. de phar.*, July 5, 1888), the death of a child was caused by the iodine resulting from the decomposition of these salts. The iron precipitates in the form of a sesquioxide, and the iodine is completely eliminated in accordance with the following formula: $2\text{FeI}_2 + \text{KClO}_3 = \text{Fe}_2\text{O}_3 + \text{KCl} + 4\text{I}$.

PHOSPHORUS AGAINST PHYLLOXERA. The *Bull. de la Soc. de phar. de Bordeaux* announces that tablets of phosphorus weighing one gramme planted (four to each vine) at a depth of 10 to 15 centimetres in the soil, kill or drive away the insects. The tablets may be coated with plaster (supposed to aid horizontal diffusion), or if the soil be calcareous, chloride of potassium may be used for that purpose. It is thought also that the phosphorus will form compounds with the soil elements to the advantage of the vines.

PLASTIC CEMENT FOR HOLLOW TEETH is formulated as follows in the *Gior. di Farm. e di Chim.*, No. 37, 1888: Paraffin, 7.50 gm; spermaceti, 7.50 gm; iodol, 4 gm; carmine, 60 cgm; yellow wax, 12 gm.

THE FLOWERS OF THE HORSE BEAN, *Vicia Faba*, *Lin.*, constitute a popular remedy in some parts of France. Dr. Bouloumié has verified their good effects in sub-acute nephritic colics with uric and phosphatic gravel, and in the pains symptomatic of renal calculus; also in a case of urethral pains from enlarged prostate. He failed to relieve in a diabetic case of acute nephritic colic. The dose is 50 or 60 flow-

ers per cup of water, two cupfuls to be taken at beginning of pain.—*Bull. de la Soc. méd. prat.*, May 31, 1888.

SOYA HISPIDA, as described by M. Lecerf (*Soc. de méd. prat.*, May 27, 1888), is a leguminous plant of Asiatic origin—now cultivated in Austro-Hungary—which possesses more proteic substances, phosphoric acid, potash and fatty matters than any other vegetable growth, and contains but 3.21 per cent of amylaceous and saccharated products. The analysis gives: Water, 9.37; proteids, 36.63; fats, 17.00; acid phosphor, 3.16; potash, 1.47. The Asiatics prepare a sort of milk from it which the Chinese make into cheese. The Japanese convert it into an alimentary liquid which they call shoyu. Bread made from it keeps fresh for several days. Dr. Dujardin-Beaumetz exhibited a sample of the latter at the *Acad. de Méd.*, May 29th, and recommended its use for diabetic patients.—*Arch. de phar.*, July 5, 1888.

TANRET'S REAGENT FOR ALBUMIN, PEPTONES AND ALKALOIDS IN URINE.—This reagent—a double iodide of potassium and mercury—precipitates these substances without the use of heat. If the precipitate does not re-dissolve with heat, the substance is albuminous; if it dissolves it is a peptone or an alkaloid. In the latter cases the cooled precipitate should be treated with ether, which dissolves an alkaloidal precipitate. It has been stated that this reagent gives insoluble combinations with certain normal elements of urine. M. Brasse (the author) finds that allantoin, alloxane, creatinine, hypoxanthine, leucine, tyrosine, xanthine, etc., do not form such compounds. When the urine contains biliary salts the precipitate does not re-dissolve with heat, thus leading to a supposition that albumine is present; agitation with ether, however, re-dissolves the precipitate if in reality the urine is free from albumin.—*Arch. de phar.*, July 5, 1888.

ASSAY OF PYRIDINE.—Dissolve 5 ccm. of pyridine in 100 ccm. of water. To 25 ccm. of the solution, add 1 ccm. of a 5 per cent. solution of perchloride of iron. Hydrated oxide of iron separates in flakes. If the pyridine be pure, 15.5 ccm. of normal sulphuric acid will be required to take up the flakes; German commercial pyridine takes 12.2 to 12.7 ccm.; English pyridine takes 13.1 ccm.—*Arch. de Phar.*, July 5, 1888.

BROMIDE OF CONIINE.—In a severe case of tetanic convulsions in a child *æt.* 11, Dr. Demur gave immediately 1 cgm. of the drug hypodermically, and followed with doses of 5 mgm. by the mouth every

two hours. The child ingested 6 cgm. in 23 hours and the convulsions ceased. On the following day the child took 4 doses of 5 mgm. each, and in one week was perfectly well. No toxic effect was noted, but the child complained of weakness in the legs. Demur says that the dose for children is from 5 mgm. to 1 cgm.; adults may take 1 to 2 cgm. every hour until the effect is produced. The patient must be watched while taking the drug, on account of its paralyzing action upon the muscles of the respiratory organs.—*Nouv. Rem.*, July 8, 1888. (See also *AM. JOUR. PHARM.*, 1888, p. 140.)

SACCHARIN IN GLUCOSE.—At the Paris *Conseil de Hygiène* (May 25th), M. Lepine stated that certain manufacturers had placed upon the market solid glucose and glucose syrups, containing from 1 to 2 grammes of saccharin to the kilo. A committee was appointed to investigate the sanitary aspects of the matter. In the meeting of June 22d, Dr. Dujardin-Beaumetz reported that the use of saccharin in aliments presented danger to the public health; saccharin was not an aliment but a medicament; if its use outside of therapeutics is not prohibited it will "augment the already too numerous falsifications of food products."—*Le Prog. méd.*, July 7, 1888.

SUBSTITUTE FOR GUM ARABIC.—According to the *Union pharm.*, May, 1888, Trojanowsky believes he has discovered such a product in linseed mucilage. He boils the seed in water for an hour, filters, and precipitates with two volumes of alcohol. The mucilage goes down in flakes which he separates and dries, thus attaining a grayish-brown mass equal to 10 per cent. of the raw material. It is soluble in water, and is almost tasteless and odorless. The alcohol is recovered by distillation.

TERTIAN NITRITE OF AMYL ($C_5H_{11}NO_2$) is described by Bals and Broglio as possessing the physiological and therapeutic properties of the primal nitrite but without giving rise to the well-known toxic symptoms of the latter. The authors state also that its action is more strongly marked and of longer continuance, and that it does not produce the sensation of heat and tension in the face or throbbing in the temples usually caused by the nitrite now in use. It may be inhaled in quantities of 80 to 100 drops a day without danger or inconvenience, even in cases of weak heart. It has a slight hypnotic action, usually producing a half hour's calm sleep after each inhalation.—*Gior. della acad. di med. di Torino*; *Nouv. Rem.*, June 8, 1888.

DANGERS OF ANTIPYRIN.—Dr. Raoult (*Le Prog. méd.*, May 26, 1888,) brings together some of the cases in which the use of this medicament has gained unsatisfactory results. Among the symptoms noticed by various observers were tumefaction of the face, urticaria, gastric disturbances, conjunctival catarrh, rapid pulse, cardiac oppression, leipothymia, tinnitus, cerebral depression and one case of amnesia, lasting for 18 hours. Sée states that all "these accidents are not rare and do not possess all the gravity attributed to them." The author's conclusions are, that "it remains a good medicament whose action is sure, but should be induced with circumspection. Its employment will certainly be more restrained when we learn its effects and understand better its proper indications and dosage. Then, we will have no more accidents, especially if we may be absolutely certain of the purity of the drug."

PRACTICAL NOTES FROM VARIOUS SOURCES.

BY THE EDITOR.

Iodotannate of Mercury, according to J. Nourry (*Bull. gén. Thér.*, April 30,) is a soluble compound and does not possess any appreciable metallic taste. For hypodermic use a solution is prepared from mercury 0.008 gm. ($\frac{1}{8}$ grain); iodine 0.03 gm.; kramerotannic acid 0.04 gm.; and glycerin 1 cc.

Nascent Silver iodide has been used with success in certain forms of conjunctivitis; and attention was again directed to this form of medication by Dr. Grasselli (*Recueil d'Ophthal.*), who for this purpose employs two solutions, one containing 3.56 gm. of silver nitrate, and the other 3.52 gm. of potassium iodide. The salts are dissolved separately each in 3.5 gm. of water and 6.5 gm. of glycerin, and the silver solution is kept in a blue or amber colored vial. For use two drops of the silver solution are mixed in a watch glass with three drops of the iodide solution, and this mixture is at once applied by means of a camel's hair pencil.

Permanent solution of mercuric chloride.—To the permanent solutions mentioned on pages 355 and 396 of our last volume, the following by Professor Kroenlein of Zurich is added from *Corr. Bl. f. Schw. Aerzte*. Mercuric chloride 10, sodium chloride 10, acetic acid 5, and water 75 parts. This 10 per cent. solution is intended to be kept

on hand for the rapid and convenient preparation of the weak antiseptic solutions containing $\frac{1}{16}$, $\frac{1}{8}$, etc., per cent. of mercuric chloride.

Prof. V. Meyer has shown (*Berichte Ch. Ges.*, 1887, p 1728) that though sodium chloride has a preservative influence on solutions of mercuric chloride, it does not prevent precipitation of a portion of the mercury if water having a great degree of hardness be used.

Preparation of infusion of digitalis.—A series of experiments made by Mr. Brocker, military pharmacist at Utrecht (*Jour. de méd. de Paris*, May 27), lead to the conclusion that, for preparing this infusion, only the parenchymatous portions of the leaves should be used, this containing one per cent. of digitalin, and that the veins and petioles should be rejected, because they contain only 0.02 per cent. of digitalin, and are apt to render the infusion gelatinous. Maceration for two hours at a temperature of 20°C. gives the best results; less satisfactory is the infusion made at 70°C., though it is still better than an infusion made by submitting the leaves to the action of boiling water for from five to fifteen minutes.

Pills of Agaricin.—As a remedy against the night sweats of consumptives, and to lessen the laxative properties of agaricin, Jung has found the following combination of service: Agaricin 0.5 gm; Dover's powder 7.5 gm; powdered althæa, and powdered acacia, of each 4 gm; to be made into one hundred pills, of which two are taken daily.

Aqua Capsici, in use at the Philadelphia Hospital, is prepared by Jos. W. England from tincture of capsicum fss ij which is triturated with calcium phosphate ss until all the alcohol has evaporated, when sufficient water is added to make, after filtration, one pint. Capsicum water is a colorless liquid, having a warm pungent taste.

Aqua picis.—Tar water was observed by Dr. Saint-Marc (*Lancet*, May 12) to have a hæmostatic effect, particularly if prepared from pinewood tar. It has been used in pulmonary hemorrhage as well as in hemorrhage of the uterus and kidney, and may be administered in quantities of ten to fifteen drachms during a day.

Aqua chloroformi.—According to Dr. Unna (*Monatsh. f. pr. Dermat.*) this water is a valuable vehicle for hypodermic solutions, partly on account of its local anæsthetic effect, and because it prevents the decomposition of Fowler's solution, of ergotin, and of many other substances.

Salol toothpowder.—Salol 3, powdered sepia 6; prepared chalk 24; magnesium carbonate 16; powdered sugar 6 parts. *Dental Reg.*

Dentifrice.—Creuse uses the following (*Les nouv. Remèdes*, May 24): Tonka 1 gm. and pumice in impalpable powder 8 gm.; triturate to a fine powder. Mix thoroughly Armenian bole 1 gm. with calcium carbonate 20 gm.; add to the preceding, and thoroughly incorporate with magnesium carbonate 10 gm., powdered orris root 1 gm., and sufficient oil of mint.

Odontalgic paste.—Arsenious acid 2 gm.; hydrochlorate of cocaine 2 gm.; crystallized menthol 0.5 gm.; and sufficient glycerin to make a paste. Introduced into the cavity of the tooth, this causes the pain to rapidly disappear. *Bull. gén. Thér.*, April 30; *Gior. di farm. chim.*

Suppositories of glycerin.—Glycerin injections have been found to be of good service in habitual constipation. A more convenient method of administering the glycerin, according to Boas (*D. med. Woch.*, June 7) is by means of suppository capsules each containing 1 cc. of glycerin.

Urethral pencils, retaining their shape for some hours, are recommended (*Monatsh. f. pr. Derm.*), to be prepared from cacao butter, 6; beeswax, 5; boric acid (or idoform, etc.), 2; zinc oxide, 1; and tragacanth, 4 parts. These pencils possess a certain degree of elasticity, and are best prepared of a conical form.

Salicylic collodion for the cure of warts is recommended by Vidal to be made from salicylic acid, 1 gm.; alcohol, 1 gm.; ether, 2-5 gm.; and collodion, 5 gm. It is applied daily. Salicylic collodion (strength not given) is also recommended by Dr. N. F. Penn (*N. Y. Med. Jour.*, May 19) as a sure cure for ringworm.

Ichthyol collodion, used as a local application for erysipelas, is prepared by Bilief (*Rev. Thér.*) from ichthyol, 1 gm.; ether, 1 gm.; and collodion, 15 gm.

Antineuralgic liniment.—Spirit of camphor, 90; ether, 30; tincture of opium, 6; chloroform, 20 parts. Apply with flannel.—*L'Union méd.*

Liniment for burns is recommended in *Centralbl. f. Ther.* to be made of salol, 1; olive oil, 6; and lime water, 6 parts.

Artificial cow's milk, as recommended by Dr. Ledentu, consists of white of egg, 16 gm.; almond oil, 35 gm.; sugar of milk, 40 gm.; sodium carbonate, 0.4 gm.; calcium phosphate, 0.5 gm.; and sodium

chloride, 0.2 gm; and sufficient water for one liter of emulsion.—*Concours méd.*, Jan., 1888.

Liparin is the name given by Dr. Von Mering to a mixture of 100 parts of olive oil and 6 parts of oleic acid, which has been used as a substitute for cod liver oil. (See this vol., p. 243.) *Liparin* is stated to agree well with patients, and not to disturb the digestion; being easily emulsified by means of weak alkaline liquids, it is readily absorbed from the intestines, and the patients gained in weight under this treatment. The daily dose is from one to three or four teaspoonfuls to children, and from one-half to three tablespoonfuls to adults. *Ther. Monatsh.*, Feb. 1888.

Fuchsin has been employed by Dr. Reiss (*Gaz. heb. méd. chir.*) in albuminuria with good success. The daily dose is from 1 to 5 milligrams, and in some cases 10 to 12 milligram. The urine acquired a red color; but no troublesome effects were noticed from the use of this salt.

Resorcin is considered by Dr. Andeer (*Centralbl. f. med. Wiss.*) to act as a preventive of sea-sickness, if taken on the appearance of the first symptoms, the dose being from 0.75 to 1.5 gm. In severer cases the dose is to be repeated two or three times daily until relief is obtained. Each dose is followed by a refreshing sleep usually lasting from three to five hours.

Guaiacol has been given in phthisis by Dr. Horner (*Prag. med. Woch.*) with the result of general improvement in many cases. The dose is from 0.2 to 0.5 gm. given in the form of pills.

Guaiacol exists in beechwood tar creasote, and may be prepared by the dry distillation of guaiac resin, or of vanillic acid and lime; it is also produced by heating pyrocatechin with potassa and potassium methyleulphate. It is methylpyrocatechin, is a colorless liquid of 1.117 spec. gr., boils at 200° C., and yields crystalline compounds with the alkalies and alkaline earths.

Atropine in Pilocarpine Poisoning.—Dr. Wicherkiewicz records in a Polish medical journal a case of poisoning by pilocarpine from eight minims of a two per cent. solution of pilocarpine administered hypodermatically. A subcutaneous injection of morphine and the inhalation of nitrite of amyl proving useless, two drops of a one per cent. atropine solution were administered hypodermatically. This had more effect, and the patient recovered.—*Med. News*, June 25.

SYSTEMATIC EXAMINATION OF SULPHATE AND HYDROCHLORATE OF QUININE.

By C. HIELBIG.

Translated from *Pharm. Ztschr. f. Russl.*, 1888, 258, by F. X. Moerk, Ph. G.

The examination of these quinine salts has caused quite a number of processes to be devised, but not one of these can be relied upon in furnishing a positive answer regarding the purity of these salts. To frame a method which allowed the presence or absence of the more frequently occurring impurities, such as quinidine, cinchonine and cinchonidine to be proven in a simple and comparatively rapid manner, the majority of the published processes were carried out and their merits and defects ascertained; as the result the following compilation has been found to work successfully.

For Sulphate.

A. 1 gm. with 15 cc.

For Hydrochlorate.

1 gm. and a solution of 0.4 gm. sodium sulphate in 1 cc. water, with 30 cc.

distilled water are agitated for 5 minutes, and filtered. To the filtrate is added 0.5 gm. Rochelle salt, agitated for 5 minutes, allowed to stand 5 minutes and filtered; the precipitate of tartrates is collected on a small filter and reserved, the filtrate for the

B. Detection of quinidine and cinchonine is divided into two portions, one of which is reserved; to the other add 1 drop of water of ammonia, and allow to stand for a few moments.

1. The solution remains clear; absence of quinidine and cinchonine, proceed E.

2. The solution becomes turbid; presence of quinidine and cinchonine or both; proceed C.

C. Detection of Quinidine. To the reserved portion (see B), add 0.5 gm. KI, shake for 5 minutes, allow to stand for same time. Observe either

1. The solution remains clear, if quinidine is absent; proceed D.

2. The solution becomes turbid or deposits tenacious resinous precipitate. In this case cinchonine must first be tested for according to D and then

a. In absence of cinchonine, the turbidity with KI indicates the presence of quinidine; proceed E.

b. In presence of cinchonine, the ammoniacal solution in B is

filtered, the precipitate washed with distilled water and the thalleioquin reaction¹ carried out with the precipitate. If the intense green color is produced there is quinidine present; if the green color is not produced quinidine is absent. Proceed E.

D. Detection of Cinchonine. The liquid after addition of KI is filtered and one drop water of ammonia added; set aside for a few minutes; there results:

1. Perfectly clear solution, in absence of cinchonine. Proceed E.
2. Turbid solution, if cinchonine is present. Proceed E.

E. Detection of Cinchonidine. If in the foregoing examination cinchonine or quinidine is found, the precipitate of tartrates (see A) is carefully washed with 15–20 cc. Rochelle salt solution (1–20); were these alkaloids not found this washing is superfluous. The precipitate is dissolved off the filter by use of 3 cc. dilute H_2SO_4 (1–20); to the solution 2 cc. ether and 1 cc. water of ammonia are added, the mixture is well shaken for one minute and allowed to stand at rest for five minutes. This shaking and allowing to stand is repeated several times (the time allowed not to exceed a half-hour). Notice:

1. The ethereal layer and the sides of the test tube remain perfectly clear in absence of cinchonidine.
2. The ethereal layer and the sides of the test tube become cloudy, if cinchonidine is present.

Remarks referring to Quinine containing Quinidine. By this method one-fourth or one-half per cent. quinidine cannot be detected. Often one or two per cent. quinidine will give no reaction with KI, but the presence can be ascertained by the addition of water of ammonia, which is a more delicate test. In the examination of quinine with ten per cent. quinidine nothing extraordinary is noticed, but in presence of fifteen per cent. and more of this alkaloid it is noticed on addition of Rochelle salt that the tartrates are not precipitated; this does not, however, interfere with the further detection of quinidine. Should more than fifteen per cent. quinidine be suspected, more KI must be used, otherwise it must be feared that the quinidine is not thoroughly precipitated and later may be mistaken for cinchonine. As a large percentage of quinidine prevents the separation of the tartrates and, as was found by special experiments, quinine sulphate mixed with quinidine sulphate is more difficultly soluble

¹ Excess of chlorine water prevents the thalleioquin reaction, while excess of ammonia favors it.

than the pure salt, there appears to exist a dependency between the two alkaloids.

Remarks referring to Quinine containing Cinchonidine. One-half per cent. of cinchonidine is easily detected within half an hour. Should the per cent. of cinchonidine be so minute that a precipitate can not be clearly distinguished, absence of the alkaloid must be decided upon, as the reaction is so characteristic that there can absolutely be no mistake. With one per cent. the reaction is more decided; with two per cent. there appears a deposit in the ether. Cinchonidine is recognized by the capillary rising of the precipitate beyond the ethereal layer, immediately after shaking the solution. Care must be exercised that not every slight turbidity at the line of contact of the two liquids be pronounced as cinchonidine; only in case the precipitate is capillary attracted by the side of the test tube can there be no doubt regarding its presence. If the quinine contains ten per cent. cinchonidine there appears at the line of contact of the two liquids a white cretaceous ring. Cinchonidine, in the absence of quinine, is separated as a white precipitate in the ethereal layer.

Remarks referring to Quinine containing Cinchonine. One per cent. cinchonine is easily recognized; the more cinchonine present in the quinine the greater the precipitate with water of ammonia. When more than five per cent. cinchonine is present there forms on addition of KI a turbidity of cinchonine hydriodate, which can easily be mistaken for separated quinidine; ten per cent. causes a precipitate of a tenacious character similar to quinidine hydriodate.

CHARACTERS OF DIMETHYLOXYCHINIZIN.*

[*Antipyrin, Analgesin.*]

By F. GAY and H. FORTUNÉ.

MELTING POINT.

The published statements with regard to the melting point of antipyrin are not concordant. Knorr gives 113° C.†; Regnaud gives 110°–112° C.‡; and others give from 110° to 113° C. We

*From the *Journal de Pharmacie*, June 15, p. 594. Reprinted from *Phar. Jour. and Trans.*, June 23, p. 1066.

† *Berichte*, xvi., 2597; xvii., 546, 2032; *Pharm. Journ.*, [8], xv., 341.

‡ "*Traité de Pharmacie*," ii., 964.

have examined from this point of view three samples of different brands and have found Knorr's antipyrin to melt at 105° C., antipyrin from the house of Mialhe to melt at 106° C., and antipyrin from the house of Casthelaz at 107° C. A partial explanation of the cause of these divergencies has been found in the considerable hygroscopic property of antipyrin. The above mentioned three products, dried in an oven for six hours at 100° C., and then over sulphuric acid for twelve hours, lost on an average 0.6 per cent. of their original weight. Exposed to the air they very rapidly absorbed moisture and recovered weight. The melting point of the products proved indeed to be identical; when completely dried they melted at 110° C.

SOLUBILITY.

Soluble in its own weight of water at 12° C., and with heat in half its weight of water. The aqueous solution is neutral.

Soluble in twice its weight of absolute alcohol, the solubility in this menstruum augmenting with the degree of dilution, so that it dissolves in its own weight of eighty per cent. alcohol.

Soluble in its weight of amylic alcohol, in fifty times its weight of ether, in one and a half times its weight of chloroform, and nearly insoluble in light petroleum spirit and benzin.

It is also very soluble in sulphuric, hydrochloric, nitric and phosphoric acids, with which it forms salts soluble in water.

OXIDIZING AGENTS.

Potassium Chlorate and Hydrochloric Acid.—Upon boiling the liquid becomes reddish-yellow; upon cooling, minute bright red oily drops separate. This red liquid is taken up by chloroform, which it colors greenish orange-yellow. Ether removes the coloring matter from chloroform and is colored golden-yellow.

Potassium Ferricyanide and Hydrochloric Acid.—Upon boiling becomes dark green. It deposits upon the sides of the tube a precipitate that in transmitted light shows an ultramarine color and in reflected light a bluish-green.

Chromic Anhydride.—In the cold an orange-yellow precipitate, the color of which gradually darkens. Precipitate dissolved by heat.

Potassium Permanganate.—In the cold reduction takes place. The liquid becomes purple-red, then brown, and finally colorless, with a deposit of oxide of manganese.

Manganese Dioxide and Dilute Sulphuric Acid.—Upon boiling a rose-colored liquid. Chloroform removes a part of the color, and, evaporated, leaves a brown residue that gives with water a colorless solution in which we have found unaltered antipyrin.

Potassium Bichromate and Sulphuric Acid.—In the cold reduction takes place; the liquid is colored green.

Strong Nitric Acid.—No change takes place in the cold if the acid be free from nitrous vapors; if it contain traces the liquid is colored green. With solid antipyrin, if heat be applied, nitric acid gives rise to a violent detonation.

Solution of Chloride of Lime.—In the cold, no change; with heat an energetic reaction, a brick-red precipitate being formed and the liquid colored yellow.

Sodium Hypochlorite.—In the cold, no change; with heat, a yellow coloration, but no precipitate.

Sodium Hypobromite.—With a concentrated solution of antipyrin a white precipitate in the cold, turning yellow on the application of heat, a separation taking place at the same time in the mass of the liquid of small drops of a brown liquid having an empyreumatic odor. In a one per cent. solution a drop of the reagent causes a slight precipitate which redissolves.

Chlorine Gas.—White precipitate. Chlorine water produces no change.

Bromine Vapor.—White precipitate, becoming brick red at the surface. Bromine water gives a light yellow precipitate soluble when heated.

Iodized Water.—2 cc. of the reagent and 1 cc. of one per cent. solution of antipyrin give a persistent brick-red precipitate.

Acid Nitrate of Mercury.—White precipitate.

REDUCING AGENTS.

Nascent Hydrogen.—After six hours treatment the antipyrin showed no alteration.

Nitrous Acid or Nitric Acid charged with Nitrous Vapor.—One drop of the reagent and 1 cc. of a one per cent. solution of antipyrin give a beautiful green coloration, still perceptible when diluted to 1 in 20,000; when heated the liquid becomes purple red. One cc. of the reagent and 1 cc. of a one per cent. solution give a golden yellow liquid; a slight excess of the reagent causes the liquid to pass to

orange and then red. The red liquid shows in the spectroscope a band extending from the middle of the green to the extremity of the violet. If the one per cent. solution be diluted with six times its volume of water, 1 cc. of the reagent will then give a series of tints passing from deep orange red to orange yellow, yellow, greenish yellow, and finally to emerald green. The red liquid gives in the spectroscope, in a layer a centimetre thick, an absorption band that extends from the orange to the extremity of the violet. The same reagent colors solid antipyrin red.

Sweet Spirit of Nitre.—The action of this reagent, as pointed out by Kennedy,* appears to us to approach that of nitrous acid. In the cold the one per cent. solution gradually assumes a deep green color, and after several deposits emerald-green crystals.

Hydriodic Acid.—Yellow precipitate dissolved by heat and re-forming upon cooling. Solid antipyrin is easily dissolved in the reagent and the solution evaporated to dryness leaves a deep red residue soluble in water. Chloroform removes the iodine from this solution, in which antipyrin is then found unaltered.

DEHYDRATING AGENTS.

Phosphoric Acid.—With the solution no reaction. Solid antipyrin, heated with this reagent, undergoes instantaneous decomposition, with disengagement of slightly aromatic vapor.

Concentrated Sulphuric Acid dissolves antipyrin without coloration.

Zinc Chloride.—White precipitate.

ALKALOID REAGENTS.

Millon's Reagent.—2 cc. of reagent and 4 cc. of 1 per cent. solution in neutral solution give a white precipitate in a yellow liquid; in a solution acidified with hydrochloric acid, a yellow precipitate in an orange-yellow liquid, the precipitate eventually becoming red. In an acid solution of 1 in 1000, a yellow precipitate and green liquid. In an acid solution of 1 in 20,000, a white precipitate and yellow liquid.

Mayer's Reagent.—Yellowish-white precipitate in the acid solution.

Marmé's Reagent (potassio-cadmie iodide).—Yellowish-white precipitate if the solution be acid.

Fröhde's Reagent (impure molybdic acid).—Nothing, even in acid solution.

* *Pharmaceutical Record*, 1885, p. 415.

Erdmann's Reagent (sulphuric acid with a trace of nitric acid).—Greenish-yellow coloration in the acid liquid. If a slight excess of acid be added without mixing an orange zone is formed at the surface of separation.

De Vrij and Sonnenschein's Reagent (sodium phosphomolybdate).—White precipitate in the acid solution.

Dragendorff's Reagent.—In acid solution green precipitate, then orange red ; liquid colorless.

Bouchardat's Reagent.—Brick red precipitate, the reaction being perceptible in an acidified solution of one in 20,000 of antipyrin. In an alkaline liquor a precipitate is no longer produced when diluted to one in 600.

Picric Acid (saturated solution).—Yellow precipitate, at first amorphous, but afterwards becoming crystalline. This reaction is perceptible in a solution of 1 in 4000. It can be carried out in the following manner : Place upon an object glass one drop of a solution of antipyrin ; then add a drop of picric acid solution. When the crystals have formed they can be seen under the microscope as yellow rectangular tables, or sometimes acicular, associated in a network or arborescent tufts. The two bodies react in a similar manner in alcohol solution, but the crystals are then larger.

Nessler's Reagent.—In acid solution, an abundant red-yellow precipitate.

Tannin.—Abundant white precipitate.

Gold Chloride.—Yellow precipitate.

Platinum Chloride.—Yellow precipitate.

OTHER REAGENTS.

Perchloride of Iron.—One drop of the reagent and 1 cc. of one per cent. solution give a blood-red coloration. This reaction is very distinctly manifest in a solution of 1 in 2000, and is still very perceptible in 1 in 50,000. The liquid reddened by perchloride of iron examined in the spectroscope in a layer one centimetre thick with diffused sunlight shows an absorption band extending from the orange to the violet.

Saturated Solution of Mercurous Nitrate.—One cc. of reagent and 2 cc. of one per cent. solution give a yellow precipitate floating above a blood-red liquid.

Saturated Solution of Mercuric Chloride.—One cc. of reagent and 2 cc. of solution give a white precipitate dissolved by heat.

Concentrated Solution of Stannous Chloride.—Yellowish coloration.

Concentrated Hydrochloric Acid.—According to several authors, if to 2 cc. of solution of antipyrin two drops of fuming hydrochloric acid be added the mixture is colored green, and changes to red if it be heated and a drop or two more of the acid be added. We have not been able to obtain any such reaction.

Antipyrin is consequently sufficiently characterized by the form of the crystals, the melting point of the dried substance and the foregoing reactions.

We have recognized that antipyrin resists the most energetic chemical agents. Blumenbach has shown that it resists the agents of putrefaction, and we have ourselves found it intact in urine that had been in full putrefaction for eight days. We have, on the other hand recognized that an aqueous solution of antipyrin is unsuitable to the development of inferior organisms, such as the fungi that attack the solutions of most of the alkaloids.

PYRIDINE.

By D. J. LEECH.

Pyridine (C_5H_5N) is a volatile colorless liquid, with a strong odor and a burning taste, produced during the dry distillation of many forms of organic matter. It is present in animal oil (Dippel's) made by distilling bones, and also in coal tar; it is formed, too, during the combustion of tobacco, and probably during the burning of nitre paper and several other organic substances, the fumes of which are used for the relief of asthma. Harnach and Meyer's experiments¹ led them to look upon it as a stimulant of the motor centres and nerve endings. Bochefontaine,² on the other hand, found it to be a local irritant, though after introduction into the system it causes death by paralysis. See regarded it as a depressor of the reflex irritability of the spinal cord and respiratory centre, and as the active ingredient of the various fumes from cigarettes, medicated papers, etc., which give

¹ *Arch. f. Path. und Phar.*, XII., 395.

² *Comp. rend. de la Soc. de Biol.*, Ser. VII., Tom. III., p. 5.

relief in asthma. He says that, next to iodine, it is the most useful remedy in this ailment. (See *Medical Chronicle*, Sept., 1885.) The use of pyridine has since been advocated by Neft,¹ Kovacs² (see *Medical Chronicle*, June, 1887), and others. Silva³ has examined further its action on the respiratory organs, and concludes that it acts by stimulating the trigeminal nerves, and thence the respiratory centre, which, however, it subsequently paralyses. It also influences the pneumogastric endings, causing increased secretion of the bronchial tubes. Like Bochefontaine, he found that its inhalation produced a tendency to sleep, from which he concludes that it also influences the cerebral cortex.

His⁴ has made investigations to determine what becomes of pyridine when taken internally. He started with the idea that it would undergo changes somewhat similar to those of benzol, from which it differs only by the substitution of an atom of N for one of CH. Now, benzol, when introduced into the system, is excreted as phenol, but the phenol does not appear free in the urine alone, but in a compound paired with H_2SO_4 . On giving acetate of pyridine to animals, however, he found, not what he expected, but methyl-pyridyl ammonium hydroxide ($OH.CH_3.NC_5H_5$). Oechsner de Coninck, in a communication made to the Société de Biologie (1887) whilst acknowledging the possibility of such a transformation, asserts that, from experiments made in 1884, he is satisfied a considerable portion of the pyridine taken internally escapes unchanged in the urine, saliva, and breath exhalations.

De Renzi⁵ has given pyridine internally. He finds that it decreases the frequency of the heart's action, and increases the force of the systole. It increases the blood pressure, and under its influence he has seen irregularity of the heart's action disappear. It lessens the frequency of respiration. He says that six to ten drops may be taken daily and the amount may be gradually increased to 25 drops. He recommends it in asystolism. He says it has the advantage over digitalis of acting quicker and not being cumulative. He has found it useful in angina pectoris.

¹ *N. York Med. J.*, 1886, XLIII.

² *Wien. med. Bl.*, 1886, IX.

³ *Gaz. delle Cliniche*, June, 1886.

⁴ *Arch. f. Path. u. Phar.*, XXII.

⁵ *Riv. Clin. e. terap. Napoli*, 1887.

Pyridine is not a pleasant remedy either to take internally or to inhale. It has an unsavory odor, but it seems worth a trial, when other remedies fail to relieve dyspnoea. See used it by placing about a drachm on a plate in a small room, in one corner of which the patient is seated. It may also be inhaled from water, in which it is soluble. Five to twenty drops may be added to $1\frac{1}{2}$ oz. of water in an inhaler, or four or five drops may be inhaled from a pocket-handkerchief. With regard to its internal use, further clinical experience is required before such claims, as De Renzi puts forth for it can be fully allowed.—*Med. Chronicle*, May, 1888.

SEPARATION OF RESINS.¹

By G. KLIEBHAN.

The relative solubility in various solvents, and the behavior towards acetic, sulphuric, and nitric acids, boiling aqueous soda, and ammonia, afford the best means of separating the different resins. In the following experiments, the powdered resins were treated with three times their volume of the solvent at a temperature of 29–30°. In boiling water, colophony forms a half-melted mass; shellac, mastic, elemi, and dammar agglomerate; sandarach, copal, and amber remain unchanged. In alcohol, mastic, shellac, sandarach, and colophony are soluble; elemi soluble with difficulty; dammar and amber insoluble; copal agglomerates. In ether, dammar, colophony, mastic, elemi, and sandarach are readily soluble; amber and shellac insoluble; copal swells up. Carbon bisulphide dissolves dammar and colophony readily; mastic, elemi, and sandarach with difficulty; amber and shellac not at all. Benzene dissolves dammar, mastic, and colophony; sandarach and elemi with difficulty; whilst amber, shellac, and copal are insoluble. Light petroleum dissolves dammar and mastic readily; colophony, elemi, and sandarach with difficulty; amber, copal, and shellac not at all. Acetic acid causes colophony to swell, but is without action on the other resins. Sulphuric acid dissolves all resins, but causes charring and decomposition; dammar, on the other hand, when treated with sulphuric acid becomes bright red. Nitric acid

¹*Jour. Chem. Soc.*, 1888, p. 761; *Pharm. Zeit. Russ.*, xxvi, 777–779.

colors mastic and sandarach bright yellow; elemi, a dirty yellow. Aqueous soda dissolves shellac readily; colophony with difficulty, but is without solvent action on the others. Colophony dissolves readily in strong ammonia; mastic, sandarach, and copal swell up before dissolving; whilst amber, dammar, shellac, and elemi remain unchanged.

ESTIMATION AND SEPARATION OF METALS BY MEANS OF SODIUM PYROPHOSPHATE.¹

By G. VORTMANN.

The behavior of metallic salts towards sodium pyrophosphate and acetic acid can be employed as a means of separating the metals, and the pyrophosphates thus obtained, being insoluble in water, dilute acetic acid, and solutions of ammonium salts, can be made use of for quantitative determinations.

Copper salts give with sodium pyrophosphate a bright blue precipitate, soluble in excess of the reagent; on adding acetic acid, a bright blue crystalline precipitate is obtained, the precipitation is, however, incomplete, and can be entirely prevented by the addition of sodium tartrate or sodium thiosulphate.

Cadmium salts give a precipitate soluble in excess. Acetic acid reprecipitates the salt almost completely even in the cold; by evaporating to dryness and digesting the residue with water, reprecipitation is complete. The addition of sodium tartrate or thiosulphate does not hinder precipitation.

Manganese salts yield a precipitate, soluble in excess, but completely reprecipitated by acetic acid; sodium tartrate does not prevent the precipitation.

Zinc salts behave similarly, but reprecipitation is complete only when the solution is evaporated to dryness and the residue taken up with water; sodium tartrate retards reprecipitation.

Cobalt salts give a gelatinous precipitate, soluble in excess; on shaking or heating gently, the solution becomes gelatinous but not if sodium tartrate is added. Acetic acid reprecipitates the cobalt salt. Presence of sodium tartrate does not prevent reprecipitation.

¹ *Jour. Chem. Soc.*, 1888, p. 755; *Berichte*, 1888, p. 1103.

Nickel salts behave similarly, but the addition of sodium tartrate prevents the reprecipitation with acetic acid.

Ferrous salts yield a precipitate soluble in excess, but completely reprecipitated on addition of acetic acid.

Ferric salts give a precipitate soluble in excess and not precipitated by acetic acid; on addition of acetic acid and sodium sulphite, reprecipitation is complete.

Aluminium salts give a precipitate soluble in excess, but completely reprecipitated by adding acetic acid and boiling; the addition of sodium tartrate prevents reprecipitation.

Uranic salts give a precipitate soluble in excess and not reprecipitated by acetic acid.

Chromic salts give a bright green precipitate which is scarcely soluble in excess even on boiling. Acetic acid prevents the precipitation of chromic salts, but the solution becomes turbid; the addition of sodium tartrate prevents the turbidity.

From the above results it will be seen that by means of sodium pyrophosphate copper can be separated from cadmium, cobalt from nickel, manganese and zinc from ferric salts, manganese from aluminium and uranium, and ferrous salts from aluminium and uranium, possibly also from chromium and ferric salts. Cadmium, zinc, manganese, cobalt, nickel, possibly also iron and aluminium, can be estimated as pyrophosphates.

ACTION OF BLEACHING AGENTS ON WRITING INK.¹

By R. IRVINE.

The author made a series of experiments to ascertain whether it is possible to tell the age of writing, and if writing has been executed at one and the same time, and if so, at what time. He selected writing one day, six months, 12 months, 2 years, 6 years, 14 years, and 22 years old, and exposed these writings to the action of a very dilute solution of bleaching powder, sp. gr. 1.001. In six minutes, the newly-written matter had disappeared; in from nine to twelve minutes, the writing of six months ago had disappeared; in twenty minutes, the writing of two years had partly disappeared, whilst in a like time the writing of six years ago was not greatly affected, of 14 years ago very

¹*Jour. Chem. Soc.*, 1888, 764; *J. Soc. Chem., Ind.*, VI, 807—808.

slightly, and of 22 years hardly at all. Hydrogen peroxide acts more slowly but gives more definite results. When writing ink is thus bleached, most of the iron contained therein remains mordanted with the fibres of the paper, consequently writing so tampered with can be restored by the application of gallic or tannic acid. In determining the age of any particular writing, the following precautions should be observed:—(1) The inks must be those known as ordinary writing inks prepared from iron and chromium salts and galls. (2) Writing dried by means of blotting-paper is more easily removed than writing which is allowed to dry on the surface of the paper. (3) The bleaching solution must be exceedingly dilute, otherwise the action is so rapid and powerful, that both old and new writings are removed almost simultaneously. (4) The action must be carefully watched so as not to be too long continued. (5) Very old writing which has become brown by age, although it resists the action of weak solutions of bleaching powder and hydrogen peroxide, will show signs of giving way almost instantly when acted on by dilute nitric, hydrochloric, or oxalic acids.

PHARMACOPŒIA OF THE PHILADELPHIA HOSPITAL.

(Continued from page 317.)

Pulveres Bismuthi et Opii.

Each powder contains:

Bismuth Subnitrate.....	gr. x.
Powd. Opium.....	gr. j.

Dose: One powder

Pulvis Catarrhal.

Morphine Hydrochlor.....	gr. ½.
Powd. Acacia.....	gr. xxx.
Powd. Talc.....	ʒjss.
Bismuth Subnit.....	ʒjss.

Use; Insufflate into nostrils.

Sajous.

Pulveres Rhei et Gentianæ.

Each powder contains;

Powd. Rhubarb,	
Powd. Gentian,	
Powd. Ginger.....	āā gr. iij.
Sodium Bicarbonate.....	gr. x.

Dose; One or more powders.

SACCHARA.

(AROMATIC DILUENTS FOR POWDERS.)

Saccharum Anisi.

Oil of Anise.....	q. s.
Acacia.....	ʒj.
Sugar of Milk.....	q. s. ad ʒj.

Saccharum Carui.

Oil of Caraway, q. s. etc., etc.

Saccharum Cinnamomi.

Oil of Cinnamon, q. s., etc., etc.

Saccharum Feniculi.

Oil of Fennel, q. s., etc., etc.

Saccharum Menthe Piperitæ.

Oil of Peppermint, q. s. etc., etc.

SUPPOSITORIA.

Sup. Acidi Tannici.

Each suppository contains:
Tannic Acid..... gr. v.
Dose: One suppository.

Sup. Cinchoninæ.

Each suppository contains:
Cinchonine Sulphate..... gr. v or x.
Dose: One suppository.

Sup. Iodoformi.

Each suppository contains:
Iodoform..... gr. v.
Dose: One suppository.

Sup. Opii.

Each suppository contains:
Powd. Opium..... gr. $\frac{1}{2}$, j, or ij.
Dose: One suppository.

Sup. Opii et Belladonnæ.

Each suppository contains:
Powd. Opium..... gr. j.
Ext. of Belladonna..... gr. $\frac{1}{4}$.
Dose: One suppository.

Sup. Opii et Plumbi.

Each suppository contains:
Powd. Opium..... gr. j.
Lead Acetate..... gr. iij.
Dose: One suppository.

Sup. Quinidinæ.

Each suppository contains:
Quinidine Sulphate..... gr. v or x.
Dose: One suppository.

SYRUPI.

Syrupus Calcii Phosphatis.

Each teaspoonful contains:
Calcium Phos. (ppt'd)..... gr. v.
Hydrochloric acid..... m. iijss.
Syrup..... q. s. ad $\mathfrak{f}\mathfrak{3}\mathfrak{j}$.
Dose: One teaspoonful.

Wiegand.

Syrupus Cascaræ Sagradæ.

Each tablespoonful contains:
Fl. Fxt. of Cascara Sag $\mathfrak{f}\mathfrak{3}\mathfrak{j}$.
Syrup..... q. s. ad $\mathfrak{f}\mathfrak{3}\mathfrak{iv}$.
Dose: One tablespoonful.

Syrupus Chloralis.

Each teaspoonful contains:
Chloral Hydrate..... gr. x.
Syrup..... q. s. ad $\mathfrak{f}\mathfrak{3}\mathfrak{i}$.
Dose: One or more teaspoonfuls.
B. P.

Syrupus Phosphatis Comp.

Each teaspoonful contains:
Ferrous Phosphate (U. S. P. '80.):
Calcium Phosphate..... gr. j.
Sodium Phosphate..... gr. iij.
Potassium Phosphate..... \mathfrak{ss} gr. $\frac{1}{2}$.
Dilute Phosphoric Acid q. s.
Syrup..... q. s. ad $\mathfrak{f}\mathfrak{3}\mathfrak{j}$.
Dose: One or more teaspoonfuls.
Parrish.

Syrupus Guaiaci.

Each teaspoonful contains:
Guaiaac..... gr. v.
Solution of Potassa..... q. s.
Syrup..... q. s. ad $\mathfrak{f}\mathfrak{3}\mathfrak{j}$.
Dose: One teaspoonful.

Syrupus Hypophos. cum Ferro.

Each teaspoonful contains:
Ferrous Lactate..... gr. j.
Lactic Acid..... gtt. iv.
Syr. of Hypophos. Co... q. s. ad $\mathfrak{f}\mathfrak{3}\mathfrak{j}$.
Dose. One or more teaspoonfuls.

Syrupus Potassii Iodidi.

Each teaspoonful contains:
Potassium Iodide..... gr. viijss.
Syr. Sarsap. Co..... q. s. ad $\mathfrak{f}\mathfrak{3}\mathfrak{j}$.
Dose: One to two teaspoonfuls.

Syrupus Potassii Iodidi Co.

Each teaspoonful contains:
Corrosive Sublimate..... gr. $\frac{1}{4}$.
Potassium Iodide..... gr. viijss.
Syr. Sarsap. Co..... q. s. ad $\mathfrak{f}\mathfrak{3}\mathfrak{j}$.
Dose: One to two teaspoonfuls.

UNGUENTA.

Unguentum Album.

Zinc Oxide..... gr. xxx.
Alcohol..... $\mathfrak{f}\mathfrak{3}\mathfrak{j}$.
Castor Oil..... q. s. ad $\mathfrak{3}\mathfrak{j}$.
Horner.

Ung. Acidi Carbolic.

Carbolic Acid.....	3 ss.
Glycerin.....	f 3 j.
Cerate.....	q. s. ad 3 j.

Ung. Hydrarg. Ammon.

White Precipitate.....	gr. xl.
Cerate.....	q. s. ad 3 j.
	U. S. P. (1870.)

Ung. Hydrarg. Nii. Dil.

Citrine Ointment.....	3 iv.
Glycerin.....	f 3 j.
Cerate.....	q. s. ad 3 j.

Unguentum Mauri.

Powd. Rhubarb.....	
Powd. Opium.....	aa 3 ss.
Citrine Ointment.....	3 j.
Cosmolin.....	q. s. ad 3 j.
	Maury.

Ung. Peruvianum.

Balsam of Peru.....	f 3 ss.
Cerate.....	q. s. ad 3 j.

Ung. Zinci Oxid. Carbol.

Carbolic Acid.....	f 3 ss.
Glycerin.....	f 3 j.
Zinc Oxide Ointment...	q. s. ad 3 j.

PROCEEDINGS OF STATE PHARMACEUTICAL ASSOCIATIONS.

The Arkansas Association of Pharmacists held its sixth annual meeting in Little Rock, in the Senate Chamber, June 12th, president W. W. Kerr in the chair. The report of officers and committees, propositions made by the president in his annual address, amendments to constitution and by-laws, and the draft of a pharmacy law, occupied the greater portion of the Association's time during the three days. W. W. Kerr, Batesville, was re-elected president; J. W. Beidelman, Little Rock, secretary, and E. P. Schaer, Little Rock, treasurer.

The Florida State Pharmaceutical Association held its first annual meeting in Tallahassee, May 8th, and was welcomed by ex-Governor Bloxham. President Robertson delivered an address, and reports were made by the secretary and treasurer. The Committee on Private Formule, by its chairman, Dr. J. D. Palmer, presented formulas for eight preparations which, with some changes, were adopted. A committee was appointed to prepare a pharmacy bill, send a copy of the draft to each member for criticism, and present a perfected bill to the next session of the legislature. A petition was signed for the reduction of the internal revenue tax on spirits. Dr. J. Dabney Palmer, Monticello, was elected president; S. P. Watson, Jacksonville, secretary, and H. V. R. Schrader, Tallahassee, treasurer. The regular meetings are to be held in May, according to the By-laws. The Association intended to meet next year at the same time and place as the State Medical Association; but the latter subsequently deciding to meet next year at Key West, on the second Tuesday in April, the Pharmaceutical Association will have to select another place.

The Minnesota Pharmaceutical Association met at Stillwater, June 12th, President Allen in the chair. The mayor extended the courtesies of the city. In the president's address various recommendations were made, the

most important, one perhaps, being the establishment of a department of pharmacy in the State University. The various officers and committees made their reports. The poison law, the revenue tax on alcohol, and other trade measures were fully discussed. The officers for the present year are: J. C. Henning, Stillwater, president; Karl Simmon, St. Paul, secretary; and Chas. L. Roos, New Ulm, treasurer. The next meeting will be held at St. Paul, June 11, 1889.

The Missouri Pharmaceutical Association had its tenth annual meeting at Pertle Springs, commencing June 19, President Gallagher in the chair. The president's address passed in review the progress of the Association, and made suggestions for future work. The reports of the secretary and treasurer, and of the different committees were presented and acted upon. Twenty-nine papers were received; among the titles we notice the following: "Preliminary Education of the Pharmacist," by Prof. Curtman; "Pharmacy Legislation," by Prof. Good; "Mineral Waters," by Dr. Enno Sander; "Castor Oil," by G. H. C. Klie; "Oil of Citronella," by C. H. Ault; "Pharmacopoeial Microscopy," by Prof. Whelpley; "Observations on Precipitates," by Prof. Wall; "Uses of Paper Pulp," by J. C. Falk, etc.

Prof. J. M. Good was elected president, G. H. C. Klie, secretary, and G. J. Meyer, treasurer. The next meeting will again be held at Pertle Springs, June 18, 1889.

The New York State Pharmaceutical Association convened its tenth annual meeting at the Prospect Park House, Catskill, June 19. President Sager presented an address, and the secretary, treasurer, and the various committees made reports, including a report from the Board of Pharmacy. A section of the Penal Code of New York, requiring the registration of the sales of all poisons and poisonous substances, caused some discussion, resulting in the appointment of a committee charged with securing a revision of this clause.

Among the papers read were the following: "Pharmacopoeial Plants of New York State," by Dr. H. B. Husted; "Homes of South American Drugs," by Dr. H. H. Rusby; "Flowers and their Winged Friends," by Dr. R. G. Eccles; "Treatment and Distillation of Peppermint Plants," by A. M. Todd (see July number, p. 328); "Morphine Solutions," by Dr. Eccles; "Elixir of Phosphate of Iron, Quinine and Strychnine," by F. P. Dalzel; "Pharmaceutical Notes," by F. J. Wulling; "Pharmacopoeial Assays," by W. G. Gregory, and several papers relating to trade matters. In a paper on "Factitious Glycerin," Prof. Bedford reported that he had been unable to find in the market a spurious article. In another paper he argued in favor of consolidating the four Pharmacy Boards of New York State into one body; and in a third paper he presented good reasons for not offering competitive prizes for essays read. Dr. R. G. Eccles, Brooklyn, was elected President, Clay W. Holmes, Elmira, secretary, and C. H. Butler, Oswego, treasurer. The next meeting will be held at Binghamton, at a date to be named by the Executive Committee. J. Schnell, Binghamton, is local secretary.

The Tennessee Druggists' Association held its annual meeting in Chattanooga May 2d. The usual routine business was transacted, several papers were read, and a committee was elected to draft a pharmacy bill, to be presented to the legislature at its next session. Dr. R. A. Sloan, Chattanooga, was elected president; J. L. Thompson, Nashville, secretary, and E. L. Laurent, Nashville, treasurer. The next meeting will take place at Memphis, May 8th, 1889.

The Texas Pharmaceutical Association held its ninth annual meeting in Austin, June 12. The president's address and the reports of officers and committees were appropriately disposed of. Papers were read by Mr. E. D. Oesch, *Pharmaceutical Notes*, and by J. D. Kennedy on the loco-weed, *Astragalus mollissimus*. The latter paper is of particular interest, because it shows that dogs are not affected by the loco-weed, given to them in infusion or decoction, except, perhaps, by an increase of appetite. Experiments upon herbivorous animals have not been made, so it appears, and this is to be regretted since the plant is credited with producing decidedly poisonous effects in horses and cattle. Any ill effects produced by this plant are ascribed by the author to its tough and indigestible character rather than to the presence of a poisonous principle.

The next meeting will be held in Dallas on the second Tuesday (14th day) of May, 1889, Theo. Meyer being chosen local secretary. J. W. Graham, Austin, is president; E. D. Oesch, Fort Worth, secretary, and E. W. Marshall, treasurer.

The following printed Proceedings of State Pharmaceutical Associations have been received:

Connecticut.—Twelfth meeting, Feb. 7-8, 1888. Pp. 100. See April number, p. 222.

Dakota.—Second meeting, Aug. 2-3, 1887. Pp. 32. With Report of the North Dakota Board of Pharmacy from May 11, 1887, to Jan. 1888. (Pp. 33.)

Florida.—May 8-9, 1888. See above, p. 425.

Virginia.—Seventh meeting, May 8-9, 1888. See July Number, p. 380.

EDITORIAL DEPARTMENT.

THE AMERICAN PHARMACEUTICAL ASSOCIATION will hold its thirty-sixth annual meeting in the city of Detroit, commencing Monday, September 3, and the Council will hold a session on the preceding day. The sessions of the Association will be held in the Detroit Light Infantry Armory, on Congress between Bates and Randolph streets, while the exhibition room is in the immediate neighborhood on Larned street.

The regular excursion rates have been granted by all the railroads belonging to the Trunk Line Association and the Central Traffic Association, the rate being full fare going to Detroit, and one-third highest limited fare for return trip, with no stop-over privilege. Before purchasing tickets for the

trip to Detroit blank certificates must be procured from the ticket agents in the territory of the Central Traffic Association from Niagara Falls, Salamanca, Pittsburg, Wheeling and Parkersburg and westward; for all points east of the cities named from the permanent secretary; but special arrangements have been made from Boston by Mr. J. W. Colcord, and the Detroit and Cleveland Steam Navigation Company has offered round-trip tickets between these two cities at \$3, not including berths. These certificates must be signed by the ticket agent at the starting point, and must be endorsed by the local secretary, Mr. James Vernor in Detroit, before return tickets at the reduced rate can be obtained.

Arrangements for the accommodation of the visitors have been made with over a dozen hotels, of which the Russell, Cadillac, Benedict, Brunswick, Finney, Franklin, Madison, and others are located near the meeting room.

The Michigan State Pharmaceutical Association will likewise meet in Detroit, commencing on Tuesday, September 4, and it is proposed that a joint session of the two associations be held on Tuesday evening.

A committee of ladies of Detroit will be in constant attendance at the parlors of the Light Infantry Armory, which have been specially reserved for the use of the ladies.

The entertainments will comprise for the ladies a carriage ride on Wednesday, and a trip to Island Park on Thursday forenoon. On Wednesday evening a reception will be tendered to the officers. Thursday evening has been set apart for a visit to the Opera House, and for Friday, after adjournment, a boat ride of about 75 miles is contemplated across Lake St. Clair, and through the St. Clair flats ship canal. Badges entitling to admission to the different entertainments will be \$3.

No arrangements for trips after adjournment have been planned; but the local secretary will give his services to those who may wish to make a special trip, and who will notify him of the time and number going. During the meeting the local secretary's office will be in the exhibition building.

The cause of the reduction in the price of Sulphate of Quinine has been explained in a report made to the Manufacturers' Club of Philadelphia, April, 1888, from which we quote the following:

The reduction in the price of Quinine was universal; as great in Europe as here, and was brought about by the large supplies of cultivated East India Bark, and not by the removal of the duty.

Formerly all Cinchona Bark came from South America, and the trees were not under any system of cultivation. Fearing an eventual failure of supplies of bark, England and Holland commenced the cultivation of the Cinchona trees in India, Java, etc. After a lapse of years, necessary to the growth of the plants, exports commenced, from India first, and then from Java. In February, 1861, the first instalment of seeds arrived in Ceylon, from South America.

In 1860, the export was but 28 ounces of bark.

1882-83, Ceylon, etc., exported	6,926,566,	and in 1883-84, Java,	1,104,584 pounds of bark.
1883-84, " " "	11,500,000,	" 1884-85, " "	1,196,970 " "
1885-86, " " "	15,225,000,	" 1885-86, " "	1,531,156 " "
1886-87, " " "	14,007,500,	" 1886-87, " "	2,230,275 " "

Sulphate of Quinine was made free in 1879, but to illustrate fully the effects of this legislative action upon this article, it is necessary to go back a few years beyond 1879, and compare the importations under a 20-per-cent ad valorem duty, with the importations which immediately followed the placing of Quinine upon the free list.

The importations for the past fourteen fiscal years, ending with the 30th of June in each year, have been as follows :

Years.	Ounces.	Years.	Ounces.
1874 . . 20 per cent. duty	68,007	1881 . . Free	408,851
1875 . . " "	12,279	1882 . . "	794,495
1876 . . " "	22,746	1883 . . "	1,055,764
1877 . . " "	75,804	1884 . . "	1,263,782
1878 . . " "	17,549	1885 . . "	1,890,126
1879 . . " "	228,348	1886 . . "	1,251,556
1880 . . Free	416,998	1887 . . "	2,180,157

Not a single ounce of American Sulphate of Quinine was exported during this period. What other result could have been anticipated than the large importations presented above? * * * * Under moderate protection (and the duty of 20 per cent. ad valorem was a very moderate one) the 2,180,157 ounces of Sulphate of Quinine made in England, France, Germany and Italy, and sent to this country for consumption during the fiscal year ending June 30, 1887, would have been manufactured here.

The prices in Europe before and after the removal of the duty in the United States :

AVERAGE PRICES IN THE LONDON MARKET.

English, in 1-ounce vials,	18s. 2d. per ounce — \$3 16	} in 1877.
French, " "	12s. 8d. " — 2 94	
Italian and German, in tins, 1ls. 8d. "	— 2 80	
English, in 1-ounce vials,	12s. 4d. per ounce — \$2 96	} in 1879.
French, " "	12s. 4d. " — 2 96	
Italian and German, in tins, 1ls. 2d. "	— 2 66	

MAXIMUM PRICES IN THE LONDON MARKET, 1877.

English in one-ounce vials,	16s. 6d per ounce — \$3.96.
French " "	15s. 9d " — \$3.78.
Italian and German in tins,	15s. " — \$3.60.

MINIMUM PRICES IN THE LONDON MARKET, 1887.

Now we submit the following as quotations named in the London market for Sulphate of Quinine, November, 1887 :

English in one-ounce vials,	2s. 1d — 50 cents in London.
French " "	2s. — 48 " "
German and Italian in tins,	1s. 8d — 30 " "

Here we have London prices for foreign makes of Quinine :

50 cents in 1887, against \$3.96 for English, in vials, in 1877.
48 " " " 3.78 for French, " " " "
30 " " " 3.60 for German and Italian in tins, 1877.

As Quinine dropped, in price, throughout the world (from 80 to 90 per cent. between the years 1877 and 1887), and as English, French, German, Italian, and all manufacturers, irrespective of locality, lowered their figures, it follows logically that the controlling influence must have been one and

the same, viz.: The lowering of prices for Cinchona Bark, brought about by the large supplies from East India and Java.

The duty of 20 per cent. imposed on foreign Quinine by the tariff of the United States previous to July, 1879, certainly was not the cause of the high price which existed in Europe, and the removal of the duty did not reduce the price there. In Italy the duty on all Salts of Cinchona Bark is five francs per kilo, and the government pays the Italian manufacturer three and one-half francs per kilo on all exported.

The report was accompanied by a table giving the highest and lowest prices of American Quinine during each year from 1823 to May, 1888. This table agrees with the one furnished by Samuel F. Troth, for the years 1823-1853, and published in this journal 1879 page 156. To complete the record we give here the prices of American Quinine, from 1854 to May 18, 1888.

YEAR.	HIGHEST.	LOWEST.	YEAR.	HIGHEST.	LOWEST.	YEAR.	HIGHEST.	LOWEST.
1854	\$2 50	\$2 50	1866	\$2 60	\$2 25	1878	\$3 60	\$3 40
1855	3 00	2 60	1867	2 20	1 95	1879	3 60	2 60
1856	2 60	2 40	1868	2 35	1 90	1880	3 25	2 25
1857	2 00	1 40	1869	2 80	2 00	1881	3 25	1 90
1858	1 40	1 25	1870	2 80	2 10	1882	2 50	1 80
1859	1 50	1 25	1871	2 45	2 20	1883	1 80	1 60
1860	1 80	1 30	1872	2 45	2 40	1884	1 80	90
1861	2 10	1 80	1873	2 55	2 45	1885	1 05	75
1862	2 90	2 25	1874	2 50	2 20	1886		65
1863	3 25	2 70	1875	2 30	2 15	1887	70	50
1864	3 75	2 60	1876	2 70	2 20	1888	56	50
1865	3 40	2 20	1877	4 50	2 70			

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Twenty-fourth Annual Report of the Alumni Association, with the exercises of the Sixty-seventh Commencement of the Philadelphia College of Pharmacy for the year 1887-88. 8 vo., pp. 256.

This report, which may be obtained from the Secretary of the Association, Wm. E. Krewson, Ph. G., gives the minutes of the annual meeting, of the sessions of the Executive Board, of the social meetings held during the year, etc. The addresses delivered at these meetings, and of which the titles were given on page 219 of our April number, are printed in full, together with some of the discussions had, and make the volume of permanent value also to others than the Alumni of the college. Necessarily, much of its contents are of particular interest to former students, and especially to the members of the last class.

The organization of the Association was effected July 15, 1864, the twenty-fifth anniversary of which date will probably be celebrated in some appropriate manner. It may have been this coming event which has suggested to some of the Alumni the inauguration of a movement for the

erection of a new building in front of those buildings now used by the college for its library, museum, lecture-rooms and laboratories, and for making such other alterations as may seem desirable. This is at least the end in view, as will be seen from the following notice printed on page 233 of the Report :

Philadelphia College of Pharmacy,
 No. 145 N. 10th St.,

PHILADELPHIA, May 10, 1888.

The Alumni Association, realizing that the constantly increasing classes of the Philadelphia College of Pharmacy are taxing her present large and commodious buildings to their utmost capacity, and, knowing the *necessity* for increased facilities, feel that the *time has come* to extend a helping hand to our Alma Mater; and, through the undersigned committee, would ask the *liberal* assistance of all graduates of the college.

It is the desire of the Association to secure sufficient means to erect a suitable building upon the Tenth Street front (now occupied by dwellings), thereby giving largely increased facilities in the present buildings, by the removal of the museum, library, reading-room, some of the laboratories and offices to the proposed new building. To attain this end, the committee *strongly urge* all graduates of our college, and others interested in the advancement of scientific education, to extend their hearty and liberal support.

This appeal will be widely circulated among the friends of the college, and there are surely very many who would gladly give a moderate amount to secure the completion of this much-needed improvement.

Do not hesitate to forward *any amount, either large or small*, that you may be able to contribute, as all will be properly credited and acknowledged.

A *prompt response* will greatly facilitate the work of the committee, who are anxious to secure a sufficient sum to warrant the prosecution of the work *at as early a date as possible*.

Howard B. French, Ph. G., York avenue and Callowhill street,

Robert Shoemaker, N. E. cor. Front and Race streets,

T. Morris Perot, Ph. G., 814 Vine street,

Committee.

Dr. Clement B. Lowe, Ph. G., President Alumni Association, N. E. cor. Ninth and Vine streets.

Wm. E. Krewson, Ph. G., Secretary Alumni Association, 1829 N. Eighth street.

Thos. S. Wiegand, Ph. G., Actuary of the College, 145 N. Tenth street.

Coca at Home and Abroad. By Dr. H. H. Rusby; New York. Pp. 39.

Reprint from the March and May numbers of "The Therapeutic Gazette."

Water; Its Impurities Gathered from the Air and Earth. By C. W. Moore, M. D. San Francisco. Pp. 79.

Reprint from the March number of the "Pacific Record of Medicine and Surgery."

L' Huître de la Seudre. Par J. Gautret.

The oyster of the Seudre.—According to the maritime regulations the Seudre, on the west coast of France, is regarded as a branch of the sea, and not as a river. Here the oyster is cultivated.

The following inaugural dissertations, from the University of Dorpat, have been received :

Beiträge zur Chemie der Sinapis juncea und des ätherischen Senföls. Von Paul Birkenwald. Pp. 78.

Contributions to the chemistry of *Sinapis juncea* and of the volatile oil of mustard.

Untersuchungen des Inversions-Products der aus Trehalamanna stammenden Trehalose. Pp. 60.

Researches on the product of inversion of trehalose derived from trehalamanna.

Beiträge zur Kenntniss des Lycaconitins. Von Emil Dohrmann. Pp. 56.

Contributions to the knowledge of lycaconitins.

Beiträge zur Toxikologie des Anilin. Von Roderich von Engelhardt. Pp. 69.

Contributions to the toxicology of aniline.

Sixth annual report of the Illinois Board of Pharmacy, with abstract of State Pharmacy Register, 1887. Springfield, Ill. 8vo., pp. 118.

A very full and comprehensive report, giving also a list of 84 cases prosecuted during the year ending June 30, 1887, for violations of the pharmacy law.

Contributions from the Herbarium of Columbia College, No. 4. By N. L. Britton and H. H. Rusby, pp. 14.

A list of plants collected by Miss M. B. Croft, at San Diego, Texas. Reprint from Transactions of the New York Academy of Sciences.

The Future of Pharmacy. By John Humphrey.

A paper read before the Sheffield Pharmaceutical and Chemical Society, and reprinted from the Pharmaceutical Journal.

Partial Syllabic lists of the Clinical Morphologies of the Blood, Sputum, Feces, Skin, Urine, Vomitus, Foods, including Potable Waters, Ice and the Air, and the Clothing (after Salisbury.) By Ephraim Cutter, M. D., etc. New York: Published by the author, 1888. 8vo. Pp. 81. Price in cloth, \$1.

The author applies the term morphology to the account (*logos*) of the forms (*morphos*) found in and upon the articles named in the title.

Some Retrospective and Prospective Thoughts on Surgery. By Donald Maclean, M. D., Detroit. Pp. 33.

Address before the American Medical Association, reprinted from the Journal of that Society.

Report of the Board of Managers of the Pennsylvania Hospital to the contributors, at their annual meeting, held fifth month, 7th, 1888. Philadelphia. 8vo. Pp. 14.

The Pennsylvania State College Agricultural Experiment Station. Bulletin, No. 3.


West Chester, Pa., the most important suburb of Philadelphia; its industrial and commercial resources; its healthfulness and social and educational advantages; its business opportunities and railway facilities, statistics, etc. Published under the auspices of the Board of Trade, 1888. 8vo. Pp. 96. Illustrated.

The reception of the above pamphlets is acknowledged.

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Powd. Ext. Belladonna Root.....	"	50	Powd. Ext. Ignatia Bean.....	"	75
Powd. Ext. Black Cohosh.....	"	40	Powd. Ext. Ipecac.....	"	90
Powd. Ext. Black Hellebore.....	"	40	Powd. Ext. Jalap.....	"	40
Powd. Ext. Black Haw.....	"	50	Powd. Ext. Jamaica Dogwood.....	"	1 20
Powd. Ext. Bladder Wrack.....	"	40	Powd. Ext. Lettuce.....	"	50
Powd. Ext. Buchu.....	"	60	Powd. Ext. Lobelia.....	"	40
Powd. Ext. Butternut.....	"	40	Powd. Ext. Mandrake.....	"	40
Powd. Ext. Calabar Bean.....	1 00	00	Powd. Ext. Mezereum.....	"	1 20
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Vol. 60

AMERICAN

No. 9

JOURNAL OF PHARMACY.

PUBLISHED BY AUTHORITY OF THE

PHILADELPHIA COLLEGE OF PHARMACY.

Under the supervision of the Publishing Committee, consisting of

HENRY N. RITTENHOUSE, JAMES T. SHINN, CHARLES BULLOOK, T. S. WIEGAND,

AND THE EDITOR

JOHN M. MAISCH.

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SEPT., 1888.

Vol. XVIII., No. 9

CONTENTS.

Grindella Robusta and Grindella Squar-
rosa. By William Henry Clark, Ph. G. . 433
Notes on the Essential Oils of Bay, Pimenta
and Cloves. By Geo. M. Berlinger, A. M.,
Ph. G. 441
Bismuth Subnitrate. By Frank X. Moerk,
Ph. G. 445
Preparation of Hydrogen Peroxide from the
Commercial Article. By Dr. Mann. . . 447
Abstracts from the French Journals. Trans-
lated for the Journal 448
Gleanings from the German Journals. By
Frank X. Moerk, Ph. G. 451
Notes on East Indian Gums. By J. G.

Prebble, Bombay 457
Notes on Senna. By Charles Hensch, F. I. C. 459
A New Base in Tea. By A. Kossel . . . 461
Pepsin. By A. Percy Smith, F. I. C., F. C. S.
Rugby 464
Relative Value of Different Pepsin Tests.
By James H. Stebbins, Jr. 466
On the Antiseptic Action of Chloroform
Water. By Prof. Salkowski 475
Minute of the College Meeting 477
Proceedings of State Pharmaceutical Asso-
ciations 477
Editorial 478
Reviews and Bibliographical Notices . . . 480

NOTICE TO READERS.

This journal is devoted to the advancement of PHARMACEUTICAL KNOWLEDGE and to the advocacy of a MORE THOROUGH EDUCATION and PRACTICAL TRAINING for all persons engaged in PREPARING and DISPENSING medicines, drugs and chemicals.

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LARGE NUMBER OF FORMULAS, are contained in it, including many which, though not official, are valuable and in use.

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NAL INDEX embracing the ten volumes (43 to 52, year 1871 to 1880 inclusive) at 50 cents each in paper covers.

An ADVERTISING SHEET is appended to each number, in which suitable advertisements will be inserted, a proper discrimination being observed in relation to their character.

Address all papers for publication, etc., to the Editor JOHN M. MAISCH.

*All communications relating to subscriptions, advertisements, etc., to the Business
Editor, H. H. WOLLE, 143 North Tenth Street, Philadelphia, Pa.*

Meetings of State Pharmaceutical Associations.

STATE.	TIME.	PLACE.	LOCAL SECRETARY.
Maryland,	Sept. 19,	Baltimore,	M. L. Byers, Hagerstown.
Michigan,	Sept. 4,	Detroit,	Jas. Vernor.
New Hampshire,	Sept. 4,	Concord,	C. Spofford, Claremont.

AMERICAN PHARMACEUTICAL ASSOCIATION.

SECTION ON SCIENTIFIC PAPERS.

"To Members of the American Pharmaceutical Association."

By vote of the Association at its last meeting, it was resolved that all papers for discussion in the section on Scientific Papers be printed previous to the September meeting, so that copies of them may be placed in the hands of the members present to facilitate the discussion.

In order that this may be done, papers should be in the hands of the Committee by the tenth day of August. They should be addressed to Dr. A. B. Lyons, Detroit, Michigan, Post Office Box 583. The earlier they are sent in, the better. Short practical papers are especially desired. Remember that in addition to the standing offer of the Ebert prize, there are to be awarded this year three special prizes, aggregating \$150, for the three best papers that shall be submitted at the September meeting.

T. ROBERTS BAKER, }
A. B. LYONS, } *Committee.*
J. M. GOOD, }

PENNSYLVANIA PHARMACY BOARD.

The next examination will be held in October, at Philadelphia and Pittsburgh. Applicants for examination should apply to the Secretary of the Board, H. B. COCHRAN, Lancaster, Pa., late in September, for the exact date and place of the meeting.

Actual producers of Oils of Wintergreen, Sassafras, Pennyroyal, wormwood and other American essential oils, will learn of something to their interest by addressing A. M. TODD, Steam Refined Essential Works, Nottawa, Mich.

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The 123rd ANNUAL WINTER SESSION will begin Monday, Oct. 1st, at 12 M. and continue 7 months.

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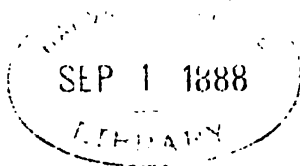
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THE AMERICAN, JOURNAL OF PHARMACY.

SEPTEMBER, 1888.

GRINDELIA ROBUSTA AND GRINDELIA SQUARROSA.

BY WILLIAM HENRY CLARK, PH.G.

From an inaugural essay.

Grindelia robusta being officinal, and no thorough investigation having been made, it was thought desirable to do so. An analysis was made in the chemical laboratory of the College, and under the direction of Professor Henry Trimble, to whom I am indebted for many valuable suggestions. An analysis of *Grindelia squarrosa* was also made at the same time, not only on account of its individual interest, but especially for purposes of comparison. The work, in general, was based on Dragendorff's Method of Plant Analysis.

DESCRIPTION OF THE DRUGS.

G. robusta and *G. squarrosa*, as found in the market, consist of the leaves and flowering tops of the herbs. They belong to the natural order Compositæ, and are found west of the Rocky Mountains, especially in California.

There being some uncertainty as to the means of distinguishing the two species, a few of the more important points of difference may be of interest.

The drugs from which each analysis was made were personally selected in the crude state from the large stock of a reliable house, and may be relied upon as genuine.

1. *G. robusta* is, as its name implies, a robust grower, with large numerous leaves; while *G. squarrosa* is more attenuated, the leaves smaller, and branches and leaves less numerous.

2. The color of *G. robusta*, as seen in the market, is of a greenish

brown; that of *G. squarrosa* is much lighter, the involucre and stems being of a straw color, the leaves pea-green.

3. The leaves of *G. robusta* are ovate, slightly serrate, sessile or clasping; those of *G. squarrosa* are lanceolate or obspatulate, more deeply serrate, and while the upper leaves may be sessile or clasping, those lower down are narrowed at the base to the midrib, which often extends half an inch or an inch from the stem before widening into the blade of the leaf.

4. The flower-heads of *G. robusta* are depressed globular, with the scales of the involucre closely appressed; those of *G. squarrosa* are nearly conical in shape, with the scales of the involucre extended or squarrose, giving the head somewhat the appearance of a burr.

PROPERTIES.

G. robusta has the reputation of being almost a specific for certain forms of asthma, and externally in rhus poisoning. *G. squarrosa* has similar properties, but is less known and used.

HISTORY OF PREVIOUS INVESTIGATIONS.

In 1876, Dr. C. J. Rademaker made a chemical analysis of *Grindelia robusta* (New Remedies, July, 1876). He exhausted the drug with a hydro-alcoholic menstruum, obtaining from the evaporated residue, by treatment with ether, "an oleo-resin having the physical appearance of balsam of tolu and the odor of resin of turpentine." The oleo-resin was treated for alkaloid by treating with acidulated water-filtering, rendering alkaline, and agitating with ether. An aqueous solution of the ethereal residue had "an alkaline reaction, and under the microscope showed well-formed prismatic crystals."

On treating for organic acids by acidulating the alkaline fluid from which the base and oleo-resin had been extracted, agitating with ether, and evaporating the ethereal layer, a residue was obtained, the aqueous solution of which had an "acid reaction, completely neutralized alkalies and formed salts. Under the microscope the acid showed well-formed acicular crystals."

Before my work was completed an analysis of *G. robusta* was made by G. Linwood Libby, an abstract of which is given in the *Pharm. Era*, January, 1888. He found an oleo-resin, an acid resin and a resin. He states that although he twice followed Dr. Rademaker's process carefully, he was unable to verify his results.

ANALYSIS.

For the quantitative analysis, 100 grams of each drug, in No. 80 powder, were used and subjected to the same treatment. The results were similar, hence the drugs will be considered together in the report. When not otherwise specified, the statements made apply to both. This is done to avoid repetition.

I. TREATMENT WITH PETROLEUM ETHER.

The drug was exhausted with petroleum ether (boiling point below 45°) in successive portions. The amount soluble in this menstruum is *G. robusta*—8.87 per cent. : *G. squarrosa*—5.94 per cent. This residue was found to consist of vegetable wax and fixed and volatile oils in the following proportions :

<i>G. robusta</i> , wax,	0.41	per cent.;	fixed oil,	8.27	per cent.;	vol. oil,	0.19	per cent
<i>G. squarrosa</i> , "	0.36	"	"	5.42	"	"	0.18	"

The wax was of a white color, solid at ordinary temperatures, melted at about 53° C. ; did not saponify with an aqueous solution of soda, but did with an alcoholic solution of soda. The addition of barium chloride formed a barium soap, insoluble in ether. The alcoholic filtrate from the soap was treated with ether and the ethereal solution evaporated, leaving a solid, white residue, melting at about 50° C., pointing to cetyl as a base.

The fixed oil was solid at ordinary temperatures, melting at 37° C., and was of a brown color. It gave a brown color on the addition of sulphuric acid. The oil was treated with a solution of caustic soda, sp. gr. 1.26. No saponification occurred, even on boiling. On diluting largely with water, however, it saponified readily, giving off the strong odor of the drug. Salt was added in excess and the soap collected. The residue was filtered, evaporated and tested by the flame test with the borax bead for glycerin, but with negative results. The soap was decomposed with hydrochloric acid and distilled with water. The distillate had oil globules floating on its surface, demonstrating the presence of a volatile fat-acid. Its odor was aromatic and somewhat valerian-like. The yield from the amount examined was too small to determine its composition by ultimate analysis.

The non-volatile fat-acids were separated by fractional precipitation with acetate of magnesium and found to consist of a mixture of palmitic, stearic and oleic acids.

Small quantities of the volatile oils were obtained by distilling each drug with water and shaking the distillate with petroleum ether. The oils resemble each other closely. They have an agreeable aromatic, pungent, somewhat mint-like odor and burning taste.

II. TREATMENT WITH ETHER.

The petroleum ether remaining in the drug was evaporated, and the drug exhausted with successive portions of ether. Proportion extracted by this solvent:—

G. robusta,	. . . .	4.02 per cent.,	of which 3.80 per cent. is resin.
G. squarrosa,	. . . .	6.92 " "	4.01 " "

The resin is soft (about the consistency of styrax), of a greenish-black color, having a smooth bland taste to the tongue, but after a short time having a very irritating effect on the fauces. It has the odor of the drug. It melts at about 40° C. On the addition of sulphuric acid the resin dissolves with a brown color and a rise in temperature. Nitric acid (sp. gr. 1.42) cold, gives a yellow-green color; on warming, effervescence takes place, with evolution of brown fumes of NO₂ and a peculiar smell.

The resin dissolves completely in a weak solution of the caustic alkalis, indicating that it is an acid-resin. On neutralizing the resin with caustic alkali, concentrating and allowing to stand, prismatic crystals were obtained, colorless, with a cooling saline taste, and insoluble in hot and cold alcohol, chloroform and ether. A portion of the resin was treated with 20 per cent. alcohol, the residue treated with 50 per cent. alcohol, and so on with 75 per cent. and 94 per cent. 75 per cent. alcohol dissolved the larger portion, very little remaining; showing that a 75° menstruum would exhaust the drugs of their resinous constituents. The different fractions obtained have the same melting point and give the same color-reactions as the original resin.

A portion of the ethereal extract was concentrated and precipitated in distilled water, the resin collected, dissolved in a little alcohol and reprecipitated in water containing one per cent. sulphuric acid. Each of these aqueous solutions of the ethereal extract were treated with petroleum ether, benzol, chloroform and ether, successively, for alkaloids, glucosides, or bitter principles. The aqueous solutions were then rendered alkaline and again agitated with the same solvents, with negative results in each case, except that the chloroform residue

gave a slight reaction for a glucoside with Fehling's solution, being the same glucoside that was extracted more freely by alcohol and water.

III. TREATMENT WITH ALCOHOL.

The drugs, freed from ether, were exhausted with successive portions of absolute alcohol. Extracted from *G. robusta* 2.04 per cent. and *G. squarrosa* 2.67 per cent. The dried residue was of a resinous or extract-like appearance, of a brown color, and acrid taste. Its aqueous solution was colored greenish black by ferric chloride, foamed on agitation, had an acid reaction and was precipitated by acetate of lead. The acidified aqueous solution gave marked alkaloidal reactions with the following reagents: potassio-mercuric iodide, tri-iodide of potassium, phosphomolybdic acid, tannin, potassio-bismuthic iodide, and picric acid. From this evidence it was assumed that an alkaloid was present. The acidified aqueous solution was agitated successively with the solvents previously used; then the solution rendered alkaline and again treated with solvents. A slight residue was obtained with each solvent—largest with chloroform—of a yellow color, soft and sticky, and of a burning, very acrid taste, especially affecting the palate. An aqueous solution of these residues was of neutral reaction: on adding the smallest portion of acid it was rendered permanently acid, and with the reagents did not give as heavy alkaloidal reactions as did the liquid which had been agitated with the solvents. No different results were obtained on testing a solution of the residues in acidulated water. One pound of each drug was then exhausted with strong alcohol, the alcohol evaporated, and the syrupy extract poured into water acidulated with one per cent. of sulphuric acid. After standing for twelve hours, with frequent stirring, the liquor was decanted, filtered, and agitated with solvents as before, both in acid and alkaline condition. The results were the same as those of the previous trial. Five pounds of *G. robusta* were then exhausted with alcohol and given the same treatment, also adding to the list of solvents acetic ether, carbon disulphide and fusel oil. No alkaloid was obtained. A portion of the solution was neutralized, evaporated to dryness and the residue agitated with solvents, with still a negative result. Extraction from the drug by Proli's fluid was tried, also without success. The methods used would undoubtedly have extracted an alkaloid had one been present, so it

is safe to say that none exists in these plants. The uniform positive reactions with the accepted alkaloidal reactions are difficult to explain, but they are probably caused by some albuminous matter peculiar to these plants.

The substance extracted by the various solvents was free from glucose until after boiling with dilute acid, showing that a glucoside had been extracted.

IV. TREATMENT WITH WATER.

	<i>G. robusta.</i>	<i>G. squarrosa.</i>
Total extract.....	12.16 per cent.	12.88 per cent.
Containing ash.....	2.80 "	2.51 "
a. Mucilage and carbohydrates precipitated		
by alcohol.....	2.17 "	1.93 "
Yielding ash.....	0.5 "	0.67 "
b. Glucose.....	1.26 "	1.90 "

Saccharose was not present.

(c) *Saponin*.—From the foamy, soapy-like character of the aqueous extract on agitation, as well as the taste of the resin and of the glucoside extracted, it was inferred that saponin or an allied body was present. A quantitative estimation by the method adopted by Christophsohn and Otten,¹ was made with the following results: *G. robusta*, 2 per cent.; *G. squarrosa*, 0.82 per cent. saponin.

As far as I have been able to learn, these are the first plants of the natural order *compositæ* in which a saponin-like body has been found, and is therefore unique. It does not give the color-reaction of true saponin with sulphuric acid, but it possesses its attributes to a marked degree. It has its soapy character; acid taste, affecting the fauces; is precipitated by baryta water; forms crystals with alkaline hydrates, and has a slight acid reaction. It is undoubtedly this that gives the acid reaction to the aqueous solutions of the various extracts. It was thought at first that this was due to the presence of organic acids; but on adding barium carbonate to the solution, it was not neutralized, even on boiling. Calcium carbonate also had no effect. Colorless, needle-shaped crystals of this saponin-like body were obtained by agitation with acetic ether (which had been freshly distilled over lime) evaporating, treating the residue with chloroform and evaporating in a desiccator over sulphuric acid. The principle in the two plants appears to be identical, and the name of

¹ Dragendorff's Plant Analysis, page 68.

grindelin is suggested for it. It is probable that the medical properties of the plants are due to this substance.

To a portion of the aqueous solution, sulphuric acid was added, and allowed to stand in a cool place for 48 hours. At the end of that time the liquid was observed to have a large number of minute acicular crystals floating in it. These were filtered off and dried, and on opening the filter, they separated in a thin, papery cone, glistening like benzoic acid. These crystals were thought to be the decomposition-product of *grindelin*, brought about by the action of the dilute acid in the cold, glucose being liberated.

To determine whether or not such was the case, a gravimetric estimation of the glucose in the liquid producing the crystals, and in the aqueous solution to which no acid had been added, was made. The supposition was verified, as the former yielded 0.26 per cent. more glucose than the latter. On boiling a solution with dilute acids, a white insoluble substance separates out, which on standing unites into a resin, having properties identical with that found in the drug. The theory is advanced that the resin found in the drug is wholly a decomposition product of *grindelin*, the greater part of the glucose set free being used by the plant as a necessary constituent to its growth and development.

(d) *Tannin*. A quantitative estimation of tannin was made with gelatin, in the presence of alum. An immediate precipitation took place in the solution of *G. robusta*. After 12 hours this was filtered off, washed, dried and weighed. 50 per cent. of the dried residue was calculated as tannin, giving a yield of about $1\frac{1}{2}$ per cent.

No tannin was found in *G. squarrosa*, no precipitate having formed at the end of 12 hours.

V. TREATMENT WITH DILUTE CAUSTIC SODA.

The drugs were exhausted with a dilute solution of caustic soda, and the substances soluble therein estimated as pectin, albuminoids, and allied bodies. *G. robusta* yielded 5.68 per cent.; *G. squarrosa* 3.56 per cent.

VI. TREATMENT WITH DILUTE HYDROCHLORIC ACID.

No starch is present in either drug.

Total extracted by above solvent: *G. robusta* 2.17 per cent., of which 1.06 per cent. is calcium oxalate. *G. squarrosa* 4.94 per cent., of which 1.00 is calcium oxalate.

VII. DETERMINATION OF LIGNIN AND CELLULOSE.

The lignin was estimated by maceration with chlorine water. *G. robusta* 3·40 per cent., *G. squarrosa* 5·71 per cent.

The residue was macerated with nitric acid and potassium chlorate.

G. robusta, intercellular substance, &c., 30·24%; sand, cellulose, &c., 12·53%.

G. squarrosa, " " " 25·44 " " " 15·03

VIII. ESTIMATION OF MOISTURE AND ASH.

G. robusta, moisture 11·12 per cent., ash 7·77 per cent.

G. squarrosa, " 11·7 " " " 5·22 " "

A qualitative analysis of the ash showed the presence of potassium, sodium, calcium, magnesium and iron as bases, and sulphuric, hydrochloric, carbonic and phosphoric acids.

Not having been able to verify Dr. Rademaker's results, I exhausted 1 lb. of *Grindelia robusta* with 75 per cent. alcohol and made a careful analysis according to his process, the results corresponding with my previous work. The substance which was extracted for "alkaloid" when treated with distilled water gave a neutral reaction; on adding one drop of water acidulated with sulphuric acid (1:500) the solution was rendered permanently acid. It was then tested, before and after boiling, with dilute acid and found to be a glucoside. The substance which came out as "organic acid," was of acid reaction, did not neutralize barium carbonate, and also reduced Fehling's solution after boiling with dilute acid, corresponding to the properties of the saponin-like body before referred to, and evidently identical with it.

NOTE BY THE EDITOR.—*The Pharmaceutical Era*, June, contains an analysis of *Grindelia robusta* by John L. Fischer, the results of which, compared with those of Mr. Clark, are as follows:

	Clark.	Fischer.
Petroleum extract.....	8·87	8·50
Ether extract.....	4·02	10·05
Alcohol extract	2·04	6·00
Water extract.....	12·16	18·05
Dilute soda solution	5·68	—
Dilute acid solution.....	2·17	2·02
Lignin	3·40	47·00
Intercellular substances	30·24	
Cellulose	12·53	
Moisture	11·12	11·06
Ash.....	7·77	—

By dissolving the water extract in distilled water, rendering the solution alkaline, and agitating with ether, Fischer obtained a principle, *grindeline*, which had an alkaline reaction and neutralized acids, the sulphate crystallizing in groups of acicular prisms; it is described as being bitter, soluble in ether, alcohol and water, and precipitated by tannin, potassio-mercuric iodide, picric acid, potassium bichromate, iodine, and the chlorides of gold and platinum. Alkalinity excepted, these properties agree with those of the yellow sticky mass obtained by Mr. Clark from the alcohol-extract by a process similar to the foregoing.

NOTES ON THE ESSENTIAL OILS OF BAY, PIMENTA AND CLOVES.

BY GEO. M. BERINGER, A. M., Ph. G.

The U. S. Pharmacopœia describes oil of myrcia as "a brownish or dark brown liquid of an aromatic, somewhat clove-like odor, a pungent, spicy taste, and a slightly acid reaction. Sp. gr. about 1.040, soluble in an equal weight of alcohol. With an equal volume of a concentrated solution of potassa it forms a semi-solid mass."

This description is incorrect in at least one important point, namely, the specific gravity stated, and misleading, if not absolutely erroneous in its statement regarding the solubility. These errors have been copied into the dispensatories and various text books without comment or correction.

The usual adulterants for this oil are the oils of cloves, pimenta and copaiba. The detection of these by color reactions or other chemical tests is difficult. The odor, specific gravity and solubility are the most important characteristics for recognizing adulteration, and so it is of the greatest importance, that our Pharmacopœia should be correct in these statements.

In the AMERICAN JOURNAL OF PHARMACY, (1887, page 286), the writer called attention to the fact that two samples of oil of bay examined, showed a sp gr. of 0.975 and 0.9945. Recently Messrs. Dodge & Olcott have called attention to this error (*Drug. Circ.*, July, 1888), stating as the result of their extended experience in distilling this oil, that the correct sp. gr. is near 0.965 at 60° F.

The authority for the pharmacopœial statement the writer has been unable to discover. Prof. Markoe (*Proc. Amer. Phar. Assoc.*, 1877)

gives the specific gravities of the various fractions of light and heavy oils obtained in the process of distillation; the fraction of the heavy oil having the highest gravity being only 1·037; the fraction of the light having the lightest gravity being 0·870. But singularly, he fails to give either the relative proportions of these two oils obtained in the process of distilling or the specific gravity of the finished oil.

Prof. J. M. Maisch, who was, perhaps, the first to record any examination of this oil, states (AMER. JOUR. PHAR., 1861) that the specific gravity must be near 0.930, as it floats in diluted alcohol, slowly rising to the surface.

The writer has carefully taken the specific gravity of a number of samples of oil of bay at 60° F., and using an accurate 10 gm. sp. gr. bottle; the following being those of fine odor, and believed from physical properties and comparatilve tests to be pure.

No. 1—0·970. No. 3—0·9672. No. 5—0·9765. No. 7—0·9828
No. 2—0·9716. No. 4—0·9696. No. 6—0·9810.

Nos. 1 and 3 are samples of Dodge & Olcott's distilling. No. 2 is a sample in the museum of the Philadelphia College of Pharmacy, received some time ago from A. H. Ruse. Judging from its fine bouquet and solubility it is likely distilled from the green leaf. No. 5 is a sample distilled in St. Thomas from green leaf.

Prof. Maisch, in his paper before referred to, states that, "with alcohol a clear solution cannot be obtained. If a single drop be added to half a fluidounce of 85 or 95 per cent. alcohol it sinks to the bottom, marking its passage down by a milky streak, and on agitation a white turbid fluid is obtained, which gradually deposits a white film leaving the supernatant liquid clear." The Pharmacopœia says, "soluble in an equal weight of alcohol." Oil of bay is peculiar in its action with alcohol. While not yielding a clear solution in 95 or 85 per cent. alcohol there is no separation of oil globules.

The writer has examined a number of specimens of this oil and has never found one yielding a perfectly clear solution with alcohol or absolute alcohol.¹ It appears to me, that the compilers of the last edition of the U. S. P. either had examined an adulterated sample of oil or did not consider it pertinent to tersely explain this important peculiarity of this oil.

Oil of pimenta and oil of cloves are correctly described in the U. S. P. as yielding solutions with an equal volume of alcohol.

¹ The oil from the green leaf appears to yield a less turbid solution.

Oil of pimenta makes a clear solution in absolute alcohol and in 95 or 85 per cent. alcohol in all proportions. It makes a clear solution with three volumes of 60 per cent. alcohol, which is not rendered cloudy on further addition of the alcohol. With five volumes of 50 per cent alcohol it makes a turbid, milky solution without separation of oil globules, the opalescence diminishing on increasing the alcohol, a clear solution being produced when thirty volumes of diluted alcohol have been added.

Oil of cloves is soluble in all proportions of absolute alcohol and 95 per cent. alcohol. Soluble in equal volume of 85 per cent. alcohol, which is not rendered milky on further addition. Soluble in three volumes of 60 per cent. alcohol, the solution being rendered milky on further addition of alcohol.

A mixture of 80 per cent. oil of bay and 20 per cent. oil of pimenta is soluble with slight milkiness in equal volume of alcohol. A mixture of 50 per cent. of each gave but very slight milkiness, practically a clear solution, in equal volume of alcohol, but on adding more alcohol the milkiness becomes quite apparent. Mixtures of oil of bay with oil of cloves act similarly.

Oil of bay yields a clear solution in ether, but on diluting with 85 per cent. alcohol the solution is rendered cloudy, and on standing it gradually becomes clear, depositing a white film. Oil of bay yields a clear solution in benzin, chloroform and amylic alcohol; a milky solution in absolute alcohol, alcohol, methylic alcohol, turpentine, benzol, carbon bisulphide, glacial acetic acid, acetic ether and acetone.

Oil of pimenta yields a clear solution in ether, which remains clear on the addition of (85 per cent.) alcohol. It also yields a clear solution in benzin, benzol, chloroform, amylic alcohol, methylic alcohol, glacial acetic acid, acetic ether and acetone. Slightly milky in carbon bisulphide. A clear solution in equal volume of turpentine, but rendered milky on further addition.

Oil of cloves yields a clear solution in ether, not rendered milky on adding 85 per cent. alcohol. It yields a clear solution in chloroform, amylic alcohol, methylic alcohol, glacial acetic acid, acetic ether and acetone. Slightly milky with benzin; slightly milky with benzol, and not becoming clear by adding five times the volume of benzol; a milky solution in carbon bisulphide and turpentine.

I have found the following test of value in detecting the adultera-

tion of oil of bay with pimenta or cloves where the quantity of adulterant was considerable. To three drops of oil of bay, in a small test tube, add three drops of pure sulphuric acid (1·84). Tightly cork the test tube and stand aside for half an hour until the reaction is complete and the oil is resinified. Add 60 minims of 50 per cent. alcohol and shake vigorously, gradually warm the mixture, agitating it continuously until the alcohol boils. With pure oil of bay, the resin will form an insoluble mass, the alcohol remaining almost colorless or acquiring a pale, brownish yellow color, not red or purplish red.

Oil of pimenta, similarly treated, will yield a resinous mass, considerable of which dissolves in the dilute alcohol, yielding a bright red or red-brown solution.

Oil of cloves similarly treated, yields a resinous mass, which almost entirely dissolves in the dilute alcohol, yielding a bright red solution, soon acquiring a purplish-red fluorescent color.

Oil of bay, adulterated with ten per cent. of pimenta, will give a distinct red-brown solution, and five per cent. of oil of cloves can be easily detected by the purplish-red fluorescence.

Gmelin gives the specific gravity of oil of pimenta, as ascertained by Jahn, at 1·03. Gladstone (*PHAR. JOUR.*, 1872, 687) states that the specific gravity at 10° C. (50° F.) is 1·0374. The U. S. Dispensatory (15th Edit., 1031), states the specific gravity at 1·021, but varies. No authority is given for this statement. The U. S. P. gives it as 1·040. Samples recently examined showed 1·0485 and 1·0525.

The German Pharmacopœia states the specific gravity of oil of cloves at 1·041 to 1·060. The U. S. Pharmacopœia says about 1·050. Samples examined showed the following, 1·0494, 1·0426, 1·0450 and 1·0596. The last sample was adulterated with the oil of cassia. A sample of oil of clove stalks showed a sp. gr. of 1·0672. The National Dispensatory states the sp. gr. of this oil to be 1·009. I am inclined to think this a mistake, as the odor is very similar and its behavior with solvents and chemical reactions are identical with oil of cloves. Its composition is likely similar if not identical.

“One drop of oil of cloves in 4 grams of alcohol is colored blue on the addition of one drop of a mixture of 1 part solution of ferric chloride and 20 parts water.” *Ph. G.*—Oil of bay similarly tested yields a pale yellowish green color. Oil of pimenta, a bright green. These colors soon fade and are immediately destroyed on the addition of hydrochloric acid.

The U. S. P. describes oil of cloves, as well as the oils of bay and pimenta, as slightly acid. The German Pharmacopœia states, "oil of cloves does not redden litmus." The following delicate reaction served to show the distinct acidity of these three oils. Ten drops of the oil was thoroughly shaken with half a fluidounce of boiling, distilled water, and when cold, filtered through a moistened filter. To one drachm of this filtrate was added, drop by drop, a small quantity of a very weak solution of phenolphthalein, made by adding 4 drops of one per cent. solution of phenolphthalein to a half fluidounce of water, and reddening by adding a couple of drops of liquor potassæ. Each fluid drachm of the aqueous solution of the oil was found sufficient to decolorize from 3 to 6 drops of this reagent, the color being again produced on adding a drop or two of very dilute solution of potassium hydrate.

BISMUTH SUBNITRATE.

BY FRANK X. MOERK, PH. G.

In calculating a formula conforming to suggestions made in the last number of this journal it was found that the figures relating to the U. S. P. (1870) formula, represented parts in one and not parts in one hundred, hence, the conclusions based on these figures are erroneous.

The conditions necessary to produce a compound of the formula BiONO_3 were ascertained by making a number of preparations, preceded, however, by some experiments showing the effect of NH_4NO_3 in neutral, acid and alkaline solutions upon a subnitrate of bismuth containing 11.71 per cent. oxide. The strength of the NH_4NO_3 solutions varied from 10 per cent. to 0.2 per cent.

In neutral solutions, there was no abstraction of acid noticeable, by reaction with litmus or by addition of NH_4OH to filtrate, in the cold; on warming all of the solutions reacted with litmus and NH_4OH , the more dilute the solution, the stronger the reaction. Dilute nitric acid, even in very minute quantities gave acid reaction and filtrate on addition of NH_4OH became cloudy, indicating that oxide or hydrate did exist with an acid nitrate, and, that the base and the acid salt did not react on each other.

Dilute ammonia water produced with the stronger ammonium nitrate solutions, an alkaline reaction not disappearing, even after standing several hours.

The specimens were made by varying the acidity of the mixed bismuth nitrate and ammonia solutions: No. 1, was of neutral reaction; No. 2, faintly acid; No. 3, the preceding while still moist treated with a slight though decided excess of nitric acid; No. 4, made by pouring the bismuth nitrate solution into the diluted ammonia and acidulating with HNO_3 ; No. 5, contained about $\frac{1}{2}$ per cent. free HNO_3 ; No. 6, contained 1 per cent. free HNO_3 . The mixtures were poured into small percolators and, after draining, washed with 0.2 per cent. NH_4NO_3 solution. In the first four samples little more than the quantity equal to the retained solution had to be added before the washings gave an entirely neutral reaction; in the last two, after adding more than twice this quantity the washings were decidedly acid and the ammonium nitrate was present in no larger quantity than corresponded to the solution used in washing, showing the 0.2 per cent. solution of NH_4NO_3 removed part of the acid from the precipitates. The washing was stopped and after draining the precipitate, this was dried as much as possible by pressing between filter paper, finally at a temperature below 70°C .

The amount of ammonium nitrate remaining in the dry product was inconsiderable.

In appearance Nos. 4 and 6 were the handsomest products, being almost a pure white; the others had a more or less yellowish tint dependent on amount of oxide contained in them. No. 6 on heating to drive off the moisture did not deepen in color, while No. 4 did, thus betraying the amount of oxide it contained.

	Bi_2O_3	N_2O_5	H_2O	BiONO_3	Bi_2O_3
No. 1.....	87.60	9.94	2.47	58.01	44.53
" 2.....	86.55	10.91	2.50	58.19	39.27
" 3.....	80.35	16.35	3.13	87.20	9.50
" 4.....	80.20	16.18	3.43	86.29	10.09
" 5.....	79.40	17.28	3.25	92.16	4.52
" 6.....	79.15	18.10	2.50	96.53	0.72

These results show that even in the presence of several per cent. of ammonium nitrate ammonium hydrate readily unites with the acid of the freshly precipitated salt, giving a very basic product; that BiONO_3 can only be obtained from decidedly acid solutions; that the product must be very sparingly washed (best by displacement in a percolator); that dilute NH_4NO_3 solution containing less than 0.5 per cent. will remove acid from BiONO_3 (result of experiments with

No. 6); and, lastly, that the U. S. P. (1870) formula, containing a little over one per cent. free HNO_3 will give a good product, losing, however, a portion of the water whilst drying.

The commercial products analyzed, resembling in composition Nos. 3 and 4 of the above, are very likely made by using the commercial water of ammonia, which is stronger than the officinal—10 per cent. of NH_3 .

The U. S. P. (1870) product is being examined in the laboratory by a senior student and for this reason no specimen made strictly according to those directions was examined by me.

PREPARATION OF C. P. HYDROGEN PEROXIDE FROM THE COMMERCIAL ARTICLE.

BY DR. MANN.

Translated from *Chemiker Zeitung*, 1888, p. 857.

The increased use of this preparation as an antiseptic in wound treatments has caused the study of making a pure product. The commercial article may contain HCl , H_2SO_4 , H_3PO_4 , HF , Al_2O_3 , MgO , K_2O and Na_2O as prepared for various purposes; generally CaO , derived from the water, and, if carelessly prepared, BaO and traces of Fe , Cu , Pb , Mn , etc. The following process will remove all of these, if present.

To the commercial preparation, containing about 3 per cent. H_2O_2 , $\frac{1}{4}$ per cent. of pure concentrated H_3PO_4 is added after which the solution is rendered *exactly neutral* by addition of $\text{Ba}(\text{OH})_2$. This is the important step of the process having for its object the precipitation of the phosphates of the heavy as well as of the alkaline-earth metals. The time required for the neutralization should be at least 15 minutes during which period the liquid should be stirred continuously; a turbidity will occur and on 3–5 minutes standing the precipitate will deposit, from which the supernatant clear liquid is decanted or separated by filtration. The filtrate is poured, with continual agitation, into a cold saturated solution of $\text{Ba}(\text{OH})_2$, a precipitate of hydrated BaO_2 , in pearly laminæ readily separates; H_2O_2 (the filtrate) is added as long as a precipitate forms, this, toward the end of the process, only takes place on thorough stirring of the liquid; excess of H_2O_2 should be avoided. The precipitate is washed with distilled water by decantation until only Ba can be detected in the washings.

100 parts of distilled water are mixed with 10–12 parts of pure concentrated H_2SO_4 , and to this is added, drop by drop, the BaO_2 mixed with sufficient distilled water to form a thin paste until the acid is almost neutralized. The BaO_2 if added in too large portions acts decomposingly on the H_2O_2 formed. The last traces of H_2SO_4 are best neutralized by cautious addition of $\text{Ba}(\text{OH})_2$; after standing 24 hours the clear liquid is tested for Ba and H_2SO_4 , and, if free from both, the liquid is syphoned off and, if necessary, filtered. Should either be present it would have to be removed by addition of the proper reagent, and the precipitate separated.

The H_2O_2 , thus purified, contains about 3 per cent. and will stand the most rigorous tests for purity and stability.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the AMERICAN JOURNAL OF PHARMACY.

EMULSIFYING MIXTURE.—The following is recommended by Nicot for making emulsions and for neutralizing the taste of oily and resinous drugs: Bark of quillaia saponaria, 20 gm.; balsam of tolu, 200 gm.; vanilla, 5 gm.; peel of two lemons; alcohol of 80%, 1 litre. The bark is bruised with the balsam and vanilla; the peel is added in small pieces, and the whole is then macerated with alcohol for 10 days; filter. This tincture will quickly emulsionize ol. ricini, copaiba, scammony, etc. For ol. ricini, 30 gm., use 2 gm. of the emulsive mixture; mix rapidly in a mortar and add by degrees a syrup composed of syr. simp., 40 gm.; aq. aurant. flor., 10 gm.¹—*Bull. gén. de thérap.*, July 30, 1888.

PREPARATION OF FRUIT SYRUPS.—The pure juice contains carbonic acid; the sugar is usually added while the juice is cold, and when heat is added, the gas, being unable to escape from the thick liquid, tends to raise a portion of the mass from the bottom of the vessel. The mixture thus becomes overheated and causes the formation of caramel. M. Manch (*J. de Ph. et de Ch.*, July 15) recommends that the carbonic acid be driven off the juice, by heat, before the sugar is added, and the loss made up with distilled water.

¹See also paper by H. Collier in *AMER. JOUR. PHARM.*, 1880, pp. 41–44.

UNALTERABLE SOLUTION OF PROTIODIDE OF IRON.—The formula recommended by Nicot is : Sugar, 4 gm. ; iodine, 5 gm. ; iron reduced by hydrogen, 8 gm. ; distilled water, 40 gm. ; pure glycerin, 110 gm. Mix the iodine and sugar in a porcelain mortar, adding the iron by degrees. Heat gently in a capsule stirring with a glass rod, and filter to separate the excess of iron ; then add the glycerin. The mixture should weigh 150 gm. The syrup is made by adding 6 gm. of this to 100 of syrup.¹—*Bull. gén. de thérap.*, July 30, 1888.

ACTION OF COLD UPON FERRIC SOLUTIONS.—M. Languepin submitted to cold a 30 to 100 solution of sulphate of protoxide of iron which had been exposed to the light while badly corked, and was much oxidized. The liquid consolidated in a greenish-white mass ; upon thawing it had the greenish color of protosulphate of iron. The ochre-colored deposit on the inside of the bottle had disappeared. A similar solution containing 1 to 100 of tartaric acid had also turned yellow, but became green under the influence of cold. It is curious that after undergoing this desoxidation the solutions remained unaltered for a long time. The writer observed that in using them (for photographic purposes) their strength was slightly impaired.—*Bull. de la Soc. de Ph., Bordeaux*, June, 1888.

SULPHURIC ACID MADE BY A NEW METHOD.—Carl Polony of Vienna gives the process as follows : Sulphate of lime in small pieces is placed in a crucible and exposed for 3 hours to a temperature varying between 600° and 1500° C., and at the same time to a jet of superheated steam, when the sulphate decomposes, forming sulphuric acid and hydrated lime. The acid vapors are concentrated by the usual methods. According to the *Monit. des prod. chim.*, the sulphates of sodium, barium and strontium may be used in the same way.—*Nouv. Rem.*, Aug. 8, 1888.

CAY-CAY OR THE FAT TREE OF INDO-CHINA is described in the *Bull. de la S. des études indo-chinois* as being plentiful in Cochin China, Cambodia and Annam, where it attains a height of 40 metres and a diameter of 1 m. 20. Its fruit contains an oily almond which

¹ This is considerably weaker than the *sirop d'iodure de fer* of the French Codex, 1000 gm. of which must contain 4.10 gm. iodine. For the same weight of finished syrup the U. S. P. requires 82.0 gm. iodine.—Editor AMER. JOUR. PHAR.

the monkey and wild boar eat with avidity. Brousmiche and Lanesan class it under the rutaceæ as *Irvingia harmandiana*. The natives gather, bruise and heat the fruit and express the oil, which hardens into a waxy mass. The Annamites get but 20 per cent. of fat from it. By treating with sulphide of carbon, however, 52 per cent. of fat may be extracted. The fat is not a true wax, but resembles butter of cacao, for which it may become a substitute. It melts at 38° and solidifies at 35°, and in dry distillation gives acrolein.¹—*Rev. Scientifique; Nouv. Rem.*, June 24, 1888.

GALACTOSE AND ARABINOSE.—At a meeting of the Paris Society of Pharmacy, July 4th, M. Bourquelot said that chemists are not agreed concerning the susceptibility of galactose to fermentation. He explains the disagreement as follows: Galactose does not ferment when it is pure; it will undergo alcoholic fermentation, however, whenever it contains traces of glucose. Levulose and maltose present the same phenomenon. Writers also contest the bi-rotary power of arabinose; they are in error. The reason they have not observed it is because the conditions were defective. It is indispensable to take the rotary power immediately after preparing the solution; the power attains its inferior limit within half an hour. M. Bourquelot added that with maltose, glucose and galactose,—which all possess a double rotary power—heat acts in a different manner. In maltose the power is weakest at the time of manufacture, galactose and glucose act like arabinose.—*Arch. de phar.*, Aug. 5, 1888.

GRANDIFLORINE.—M. D. Freire (*Compt. Rend., Acad. des Sci.*) gives this name to a substance he has obtained from the fruit of *Solanum grandiflorum*, var. *pulverulentum*. He treated the sarcocarp with water and hydrated lime and evaporated to dryness. This gave a residuum which was exhausted with absolute alcohol; evaporation of the filtered liquid separates a resinous matter; after cooling, the nearly solid residuum is treated by dilute hydrochloric acid, which dissolves the alkaloid but leaves the resinous matter. The solution is decolorized and precipitated by ammonia. The alkaloid, dried over sulphuric acid, is white, bitter, insoluble in water, and soluble in alkalis and dilute acids. Heated with hydrated potash, it sets free ammonia, and the solution gives alkaloidal reactions. With sulphuric acid it gives

¹ For an account of cay-cay wax by J. B. Vignoli see *AMER. JOUR. PHAR.*, 1886, p. 409.

a yellow color, deepening into red. With sulphuric acid and binoxide of manganese the yellow color changes to green and then to violet. Concentrated nitric acid gives reddish purple. The author says the substance is a powerful intoxicant and the fruit kills animals which eat of it.—*Nowv. Rem.*, June 24, 1888.

ACTION OF SULPHATE OF SPARTEINE.—Dr. Pawinsky, in an elaborate study of this drug (*Gaz. Lekars*, 1888), arrives at the following conclusions, based (clinically) upon experiments in 33 cases. In small doses of 2 or 3 cgm. or 6 to 8 cgm. daily it slows and strengthens the cardiac contractions. Doses of 8 to 12 cgm. or 1 gm. daily paralyze the heart-action; the pulse becomes slow, weak and arrhythmic. Small doses irritate the pneumo-gastric, large ones paralyze it. Small doses augment the tonicity of the vessels; the effect is observed in 40 minutes after ingestion. No cumulative action was observed, or gastric disturbance. The author cannot say that spar-teine has a direct diuretic action, but it favors diuresis and dissipates oedema and sanguineous stasis.—*Bull. gén. de therap.*, July 15, 1888; see also *AMER. JOUR. PHAR.*, 1886, p. 103, and 1887, p. 157.

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH. G.

Tincture of guaiac, a sensitive reagent for pus. The urine is filtered and a little of the reagent poured over the moist filter, a beautiful blue color is produced in presence of pus. Moderate warming favors whilst excessive heat entirely prevents the reaction. Reducing agents and caustic alkalies also prevent it. Saliva, nasal mucus, and milk also give the reaction although not so intense.—*Vitali (Bollet. Farm.) Rundsch.*, 1888, p. 531.

Olea Ætherea sine terpeno is the name proposed by Dr. Schweisinger for concentrated volatile oils made so by the removal of the non-fragrant hydrocarbon, and which represent from two to thirty volumes of the ordinary essential oils. Thus one volume of the concentrated oil represents two volumes of the oils of anise, cassia, fennel, ginger-grass, mentha crispa, mentha piperita, cloves, sassafras and star anise; two and one-half volumes of the oils bergamot, caraway and lavender; four volumes of cumin and rosemary; five volumes of thyme; six volumes of coriander; eight volumes of calamus; ten

volumes of absinth; twenty volumes of juniper; thirty volumes of angelica, lemon and orange.

They are more permanent, possess greater solubility in alcohol and water, have a finer odor rendered prominent only on great dilution, and are of constant composition, thus enabling the specific gravity and boiling point to be used as tests of purity. The use in pharmacy suggested is for medicated waters made by agitation of the oils with distilled water and filtering; also for elæosacchara, etc. They should be kept in the dark.—*Pharm. Centralh.*, 1888, No. 25.

An adhesive mixture consisting of rock candy 30 parts, dissolved in solution silicate of sodium 100 parts, is recommended by Kayser in *Bayer. Gew. Zig.*, for the adhesion of paper on paper, leather, metal (tin boxes) and wood.—*Rundsch.*, 1888, p. 574.

Nylander's Sugar Test. 2 gm. bismuth subnitrate, 4 gm. rochelle salt, 100 gm. solution of soda (8 per cent.) Advantages: Easy preparation, stability and delicacy (0.025 per cent. can still be detected). (See AMER. JOUR. PHAR., 1887, p. 396.)—*Pharm. Post*, 1888, p. 427.

Tartaric and Citric Acids. If a solution of citric acid be colored by addition of one drop of potassium chromate solution, the color, even after addition of a few drops of sulphuric acid does not change on several days' standing. Tartaric acid under similar conditions, especially on addition of sulphuric acid, more or less rapidly according to quantity present, changes to the violet color of the sesqui salts of chromium, and it is possible to positively detect $\frac{1}{2}$ per cent. tartaric acid in citric acid by allowing the time of observation to extend to a few hours. Salzer, in *Berichte*, 1888, p. 1910.

The examination of *belladonna*, *hyoscyamus* and *stramonium extracts* of the various pharmacopœias is tabularized at the conclusion of the various articles by Richard Kordes in the *Pharm. Ztschr. f. Russl.*, 1888, pp. 386, 404, 422.

The extracts were prepared from the same lot of drugs by the author, except in a few cases when the preparation was made from the fresh drug; such preparations were purchased of Merck. The extracts were mixed with lime and extracted with ether; this solution evaporated nearly to dryness and titrated with $\frac{1}{10}$ normal sulphuric acid; on obtaining a faint acid reaction, ether was added to dissolve the resinous matter precipitated, carrying with it a portion of the alkaloid; this precaution was repeated until a permanent slight acid reaction was gotten.

BELLADONNA EXTRACTS—LEAVES.

AUTHORITY.	Yield of Ext. from drug.	Solid mat- ter in Ex- tract.	Percentage of alkaloid calculated for			Percent- age of ex- tracted alkaloid.
			Normal Extract.	Dry Extr.	Drug.	
Fol. Belladonnæ...					0.6406	100.0
Germ. (Merck)...	3.5 to 4% fresh leaves	78.1%	1.2056	1.5430		
Neerl., aq. (Merck).		75.0	0.5296	0.7056		
Ross., aq. spir.....	12.0	68.3	2.1673	3.1780	0.2600	40.5
Fennic., spir.....	19.0	76.4	2.2252	2.9425	0.4270	66.6
Helvet., ".....	29.2	76.	1.8580	2.4430	0.5425	84.6
U. S., ".....	15.5		4.0500		0.6277	97.7
Internat., ".....	33.7	71.6	1.5678	2.1890	0.6383	99.6
Fennic., sic.....	57.0	100.0	0.7374	0.7374		
Helvet., ".....	87.6	100.0	0.4142	0.4142		
Ross., ".....	24.0	100.0	1.0211	1.0211		

ROOT.

Rad. Belladonna...					0.7398	100.0
Austr., spir.....	25.5	66.3	2.6828	4.0464	0.6840	92.4
Brittan., ".....	27.0	66.4	2.7212	4.0982	0.7347	99.3
Gallic., ".....	23.0	79.5	2.6920	3.3860	0.6278	84.8
Internat., ".....	29.3	68.5	2.5120	3.6060	0.7360	99.1

HYOSCYAMUS EXTRACTS—LEAVES.

Fol. Hyoscyam.....					0.14965	100.0
Germ. (Merck)...	2.5 to 3 fresh drug	76.50	0.6253	0.8043		
Neerl. ".....		77.05	0.5032	0.6532		
Austr. ".....		76.65	0.7027	0.9167		
Ross.....	10.7	66.65	0.7270	1.0907	0.07780	52.0
Fennic.....	20.0	79.60	0.5123	0.6436	0.10250	68.0
Helvet.....	18.6	76.15	0.5390	0.7078	0.09390	62.7
U. S.....	15.0	73.60	0.9472	1.2860	0.14208	94.9
Internat.....	20.6	75.20	0.6909	0.9187	0.14230	95.0
U. S., fluid.....	94.5	18.05	0.1567	0.8705	0.14808	99.0
Helv., sic.....	55.8	100.00	0.1203	0.1203		
Ross, sic.....	21.4	100.00	0.3338	0.3338		

SEEDS.

Sem. Hyoscyam ¹ ...					0.1335	100.0
Gallic.....	7	71.85	1.3591	1.893	0.0951	71.2

¹ Hyoscyamus acid yielded 28.0 per cent., and stramonium seed 26.6 per cent. oil to petroleum spirit.

STRAMONIUM EXTRACTS—LEAVES.

Fol. Stramon.....					0.2044	100.0
Neerl. (Merck).....		77.00	0.8718	1.1220		
Ross.....	12.0	74.35	0.7120	0.9570	0.0890	43.5
Helv.....	28.3	72.55	0.6308	0.8694	0.1306	68.2
Internat.....	28.4	78.00	0.7128	0.9136	0.2024	99.0

SEEDS.

Sem. Stramon ¹					0.1510	100.0
Fennic.....	7.5	76.25	1.6858	2.2108	0.1264	83.7
Gallic.....	5.0	82.30	2.5720	3.1250	0.1265	83.7
Internat.....	7.6	74.80	1.8640	2.4906	0.1416	93.8
U. S., fluid.....	87.1	6.50	0.1679	2.5829	0.1498	99.1

Oil of Cajeput is similar in composition to oil of eucalyptus, the examined specimen was lœvogyre, sp. gr. 0.934, crystallized at -50° C. the crystals melting at -8° C. Subjected to fractional distillation between 70° – 100° , aldehydes were obtained of which butyr- and valer-aldehydes were isolated; at 155° a small portion of a lœvogyre hydrocarbon $C_{10}H_{16}$ of the terpene series passed over, this formed the derivative $C_{10}H_{17}Cl$; at 165° benzaldehyde was found; between 175° – 180° (representing two-thirds of the oil) cajeputol, identical with eucalyptol distilled over. Above 180° the distillation was carried on under reduced pressure (0.04 m.) but only small fractions were obtained. Between 130° – 140° a terpenol which after purification crystallizes at -15° on introduction of a small crystal; it has the sp. gr. 0.947 and forms $C_{10}H_{16} \cdot 2HCl$. This terpenol is identical with the monatomic alcohols (isomers of the borneols) $C_{10}H_{18}O$ which have been obtained by hydration of terpinene. The higher fractions contain the acetate, butyrate and valerianate of the terpenol; a body $C_{15}H_{24}$ boiling at 160° closely related to the hydrocarbon of the oils of copaiba and cubeba; polymers of C_6H_6 with products of oxidation.—*R. Voiry, Chem. Zig. Rept.*, 1888, 186.

Sulpho-Carbolic Acid has been proven superior to carbolic acid as a disinfecting agent; it appears in the German market as "Roth's Desinfektions-Pulver" made by mixing the acid with infusorial earth first treated with a slight excess of H_2SO_4 to unite with the bases. This contains 14 per cent. of the sulpho carbolic acid.—*Pharm. Zig.*, 1888, 412.

¹ Hyoscyamus seed yielded 28.0 per cent., and stramonium seed 26.6 per cent. oil to petroleum spirit.

Glycerin and borax.—The effervescence caused on admixture of glycerin, borax or boric acid and sodium bicarbonate or carbonate has led Dr. Carl Jehn to make some experiments, the results of which show that not only glycerin but all polyatomic alcohols and aldehydes containing as many hydroxyl groups as there are carbon atoms in the formula will do the same. So erythrite $C_4H_{10}O_4$, mannite $C_6H_{14}O_6$, melampyrite (dulcite) $C_6H_{14}O_6$, as alcohols, and glucose, lævulose and galactose, $C_6H_{12}O_6$, as aldehydes will give the reaction. Quercite $C_6H_{12}O_6$, saccharose and lactose $C_{12}H_{22}O_{11}$, and glycogen $C_6H_{10}O_5$ did not start the reaction. An explanation of the reaction is not offered. See paper by W. R. Dunstan, in AMER. JOUR. PHARM., 1883, 447-456. *Arch. Pharm.*, 1888, 495.

Creasote is best administered by mixing with considerable cacao-butter, to absorb the creasote completely, and making into pills.—*Rundsch.*, 1888, 555.

Cantharidal Camphor-Chloral proposed as a substitute for cantharidal collodion by Boni (*Arch. de Pharm.*), is prepared of camphor 20; chloral-hydrate 30; powdered cantharides 10. Melt the camphor and chloral by heating to 60° , add the cantharides and, with constant stirring, maintain for some time at 60° - 70° . Filter and preserve in closely stopped bottles.—*Pharm. Zig.*, 1888, 421.

Powdered Rosin.—H. Hager in *Pharm. Zig.*, 1888, p. 420, calls attention to the liability to spontaneous combustion of this article. In the case mentioned sufficient heat had been generated to cause the greater part of the powder to reform a solid mass, although the temperature of the room was only 18° - 19° C.

A. Reinhardt, page 437 of *Pharm. Zig.*, records a similar case. It is advisable to keep the powder in tin boxes with tight fitting covers, so as to prevent as much as possible contact with the air, oxidation being the cause of the rise in temperature.

Lycopodium examined by Langer, contains moisture, 7 per cent.; ash, 1.15 per cent., chiefly phosphates; cane sugar, 2.1 per cent.; nitrogen, 0.857 per cent.; fixed oil, 49.34 per cent., which when fresh is neutral, easily becoming acid, composed of 80 to 86 per cent. *a*-decyl-*b* isopropylacrylic acid with possibly a little myristic acid, glycerin, 2.8 to 5.2 per cent. of the oil. Alcohol macerated with lycopodium at ordinary temperature for 14 days, is oxidized to aldehyde.—*Rdsch.*, 1888, p. 580.

An explosive mixture if not properly compounded: nitric acid, 5.0;

creasote, 2.0; chloroform, 3.0. Due to the chemical reaction of the first two articles which generates such heat that the chloroform boils. Proper procedure: mix the acid and creasote and allow to cool, then add the chloroform.—(*Arch. de Pharm.*) *Pharm. Zig.*, 1888, p. 442.

Liquor Ferri Albuminati.—100 gm. fresh albumen are mixed with 200 gm. distilled water, strained and the albumen completely precipitated by addition of dialyzed iron, the mixture being constantly stirred. The thick red-brown mixture is passed through a linen strainer until the liquid runs clear, after which it is washed with distilled water until the washings show no reaction with silver nitrate. The strainer, with precipitate, is placed in a tared porcelain capsule with some water, and solution of soda added until the precipitate dissolves, (best ascertained by removing a small quantity in a test tube and noting the transparency), the strainer is then removed and distilled water added to make 700 gm., to which solution is added 100 gm. glycerin, 200 gm. alcohol and any aromatic as flavor.

This solution contains 10 per cent. of ferric albuminate (= 0.65 per cent. ferric oxide), is of alkaline reaction, permanent, easily miscible with fresh and boiled milk, and is not itself changed on boiling. Dose: a teaspoonful two or three times a day, one-half hour before meals.—Köhler, *Schw. Wochenschr. f. Pharm.*, 1888, p. 219.

Tests for Carbohydrates.—Undoubtedly the furfural reactions furnish the most delicate tests for the carbohydrates. H. Schiff uses a test paper made by immersing paper in a mixture of equal volumes of xylinin and glacial acetic acid diluted with alcohol and drying. A small quantity of the substance to be tested is heated with a slight excess of concentrated sulphuric acid and the test paper held in the evolved vapors, a beautiful red color is produced owing to the formation of the furoxylinin. It will detect as little as 0.00007 gm. glucose in an aqueous solution. The author uses a furfural reaction, even more delicate than the above, detecting 0.000028 gm. glucose in solution. One drop of a dilute solution to be tested is mixed with two drops of a 15 per cent. alcoholic solution of α -naphthol in a test tube and $\frac{1}{2}$ cc. concentrated sulphuric acid is carefully poured in to form a distinct layer. If at the line of contact a violet color above a green layer is produced, carbohydrates are present. Urine is diluted with 9 volumes of water and one drop proceeded with as above. If the violet color is not produced, the urine is considered normal; if the color is produced the urine may be considered abnormal because it

yields a quantity of furfural which is also obtained from a glucose solution containing at least 0.5 per cent.

By means of these two tests carbohydrates were detected in all urines examined; albumen perfectly free from carbohydrates heated with concentrated acids formed furfural which was recognized in the distillates, establishing for the first time by chemical reactions a close relationship between the albuminoids and the carbohydrates.

In testing urine for carbohydrates, if albumen be present in larger quantities it must first be removed, small quantities do not introduce appreciable errors, owing to the small quantity of urine taken. Fehling's solution under the most favorable conditions failed to detect less than 0.00012 gm. glucose in aqueous solution; testing urine by the three tests the bodies other than carbohydrates decrease the delicacy of Fehling's test to a greater degree than the first two tests.—*Dr. L. v Udránszky, Zeitschr. f. Phys. Chem., May 1888.*

NOTES ON EAST INDIAN GUMS.

BY J. G. PREBBLE, BOMBAY.

During the last few years large quantities of gums, the production of Indian trees, have been exported from Bombay. About three-fourths of these exports go to the United Kingdom, and always I think to London, under the names of "ghátí," "amrad," "oomrawutty," etc. In a recent paper on these gums, published in this Journal,¹ these names and the origin of the gums do not appear to be well understood. Hence some notes on these points may be of interest.

"Ghátí," an aboriginal or purely Indian word, has the primary meaning of a strait or pass through a mountain. Drugs or vegetables of country or local production are sometimes distinguished as "ghátí" from those which are imported from foreign ports or from a distance; thus there is "ghátí-pitpapra" (*Justicia procumbens*), which is used as a substitute for the true pitpapra (*Fumaria officinalis*), imported from Persia, and "ghátí-mirchi" (*Capsicum annuum*), country-grown chillies, as distinguished from a variety resembling the West Indian and imported from Goa and known as "gowar-mirchi,"² and lastly

¹ "Ghatti and other Indian Substitutes for Gum Arabic," *Pharm. Journ.*, April 14, 1888; *AMER. JOUR. PHAR.*, June, p. 301.

² Dymock, "Materia Medica of Western India."

"ghátí gum, gum collected on the ghats and hills of the country and called "ghátí" in contradistinction to the variety imported from foreign ports.

The best picked "ghátí" gum as now exported from Bombay is entirely or almost entirely derived from *Anogeissus latifolia*.¹ I think Dalzell is the first author who mentions this gum. He says, "the tree produces a very white, hard and valuable gum." The Bombay name is "daura" or "dabria." It is largely used throughout India for calico printing, for which it has a high reputation, and as has been shown by Mander it may with advantage be used in pharmacy in place of the high priced and scarce Kordofan gum. I have obtained the same reactions with this gum as was observed by Mander with a London sample of "ghátí" gum, hence I conclude that his sample was free from admixture with other gums.

"Oomrawuttee gum derives its name from Oomrawuttee, or Amravti, the chief town of the Hyderabad assigned districts known as the Berars, the centre of a prosperous trade and officially described as "the very home of the cotton plant and the heart of the cotton trade in India." It gives its name to a variety of cotton staple, "the Oomrawutties," and such phrases as "good oomras," "good fine oomras," "oomra variety," are to be met with in the Bombay cotton market reports. Oomrawutti gum is considered by the native gum dealers in Bombay to be of two kinds, the "ghátí" and the "amrad;" the latter they consider to be derived from the babool tree (*Acacia arabica*). Babool gum is distinguished from all other gums that I have examined by being unaffected by either neutral or basic acetate of lead, and by being more or less darkened, but not gelatinized, by ferric chloride. Samples of babool gum that have hung long on the tree and are of a deep reddish-brown color give a very dark coloration, almost black, but the pale samples are less affected. The Oomrawuttee sample examined by Mander was evidently babool gum. With regard to the name "amrad," I do not think it has any reference to "amra," the native name for the gum derived from *Spondias mangifera*, as this gum has a character more nearly resembling tragacanth than arabic gum. Forty grains of it form a jelly with about two ounces of water. I thought it might be a corruption of "amravti," but the gum dealers can give no satisfac-

¹ I consulted Dr. Dymock on this point, and he is also of opinion that the gum now exported as ghatti is derived as stated.

tory explanation of the meaning of the word further than that it is applied to all gums of a reddish tint. It is therefore probably a word imported into India, and as the name is principally applied to Barbary and Egyptian gums it may be a corruption of the Arabic word *hamrā*, red, and this thought is supported by a statement I have recently seen that "amrad" is a corruption of "amhara,"¹ a name applied to a gum derived from an acacia.

Gums are sent to Bombay from all parts of India, but the best come from Amravti. Other centres are Nagpur, Jubbnepur and Cawnpur, and a good deal is collected on the ghats of the Bombay presidency. On arrival in Bombay they are sorted by Cooly women and children. Anogeissus gum, possessing well-marked physical characters, is easily separated, and is sent to the London market almost free from admixture, but the dark colored or amrad gums are generally mixtures of various gums, babool gum predominating. During the last financial year 20,895 cwts. of gum arabic of Indian production were exported from Bombay, valued at R7,93,934.²—*Phar. Jour. and Trans. July 7, 1888.*

NOTES ON SENNA.³

By CHARLES HEISCH, F.I.C.

Having had some samples of powdered senna brought to me by one of my inspectors, I was somewhat puzzled what to do with them. Not only was it possible that other leaves might be powdered with the senna, but that exhausted leaves might be also added. Many varieties of cassia appear to be sometimes found mixed with senna, and so long as you have the leaves you can mostly detect them, but when powdered you lose the characteristic appearances.

The principal adulterants of which I can find any account are *cynanchum argel* and *coriaria myrtifolia*, the latter being a poisonous plant used by dyers and tanners, sometimes called tanners' sumac.

How argel is to be detected in powdered senna, I cannot at present say; I have not yet got a specimen. Fortunately the worst adulterant

¹ *British and Colonial Druggist*, May, 19, p. 536.

² "Annual Statement of the Trade and Navigation of the Port of Bombay," 1886 and 1887.

³ Read at Meeting of Public Analysts, June, 1888. Reprinted from *The Analyst*, August.

—the *coriaria myrtifolia* gives when infused precipitates with gelatin, bichloride of mercury, and antim. tart. which senna does not, and also a dark blue with salts of iron. The only bad case of adulteration which I have met with was with buchu leaves. These would have attracted the attention of anyone on the look out, by their different shape and peculiar odor, but in the case referred to did not attract the attention of the purchaser, who made his senna tea, and suffered accordingly. Had the sample been in powder, the mistake would have been almost unavoidable. As partially exhausted leaves would, of course, give less ash and extract than the senna unexhausted, I made some examinations of undoubtedly pure senna leaves, both Alexandrian and Tinnevely, and though the results show nothing very striking, I think they are of sufficient interest as a small contribution to our knowledge to be worth laying before you.

No.	Kind and Source.	Total.	Sol. in Water	Sol. in HCl.	Insoluble.	Alkalinity as K_2O	Alcoholic Extract of Ash & Water-free.
1	Tinnevely, Brown and Smart	11.48	2.4	8.86	.2	1.16	30.
2	Same powdered.....	11.22	2.31	8.77	.1	1.14	29.9
3	Tinnevely, Apothecaries' Hall	11.34	2.35	8.72	.2	1.16	33.19
4	Same powdered.....	11.39	2.67	8.31	.4	1.06	31.78
5	Powdered Alexandrian, Brown and Smart.....	11.69	2.35	7.86	1.49	.84	33.3
6	Alexandrian Apothecaries' Hall	11.64	2.91	8.36	.37	1.06	29.04
7	Ditto in powder.....	11.35	2.66	7.98	.60	2.06	30.13
8	Alexandrian, Allen and Hanbury	12.36	2.96	9.02	.38	1.54	35.5
9	Same powdered.....	12.64	3.18	9.12	.24	1.76	35.41
10	Powder from Allen and Hanbury, believed to be mixed	13.98	1.22	11.91	.85	1.69	27.75
11	Powder No. 85, from Hampstead	19.01	3.01	12.86	3.14	1.22	29.55
	Ditto No. 88, ditto.....	12.89	2.48	9.05	1.36	1.25	30.00
12	Buchu leaves.....	6.06	2.73	3.25	0.07	1.47	17.49

On examining powdered senna under the microscope, one is struck by the fact that the white translucent hairs from the back of the leaf are quite unchanged by the powdering, so that if one is familiar with the appearance of undoubtedly genuine samples of powdered senna

one can get an idea if any other samples contain about the right quantity of hair, which is some guide. I then took the ash in dried samples of the leaves; the amount soluble in water and its alkalinity; the amount sol. in HCl and the insoluble; and, finally, the amount of alcoholic extract calculated on the ash and water-free leaves. The results are contained in the accompanying table.¹

It will be observed that the samples obtained from Messrs. Allen and Hanbury contain considerably more ash than the others, and with one exception yield more extract. I have added the results obtained from the two District samples of powder, which in point of extract closely resemble the majority, but one of them differs largely in ash. I have also added the results obtained from buchu leaves, which give about half, both ash and extract.

A NEW BASE IN TEA.²

By A. KOSSEL.

In the examination of large quantities of tea extract received from Dr. Fr. Witte, of Rostock, I have ascertained the presence of a new base that is associated with theine in minute proportion. The syrupy extract was operated upon in the following manner: After mixing with water sulphuric acid was added to separate smeary products, and the resulting liquid was supersaturated with ammonia. Ammoniacal solution of silver nitrate was then added, and the precipitate thus formed was collected by filtration. The precipitate was digested with warm nitric acid, the mixture filtered to separate silver salts that had deposited, and the filtrate made alkaline with ammonia. In the course of twenty-four hours a brownish amorphous precipitate was deposited, which contained the new base in the state of a silver compound, and by evaporating the clear filtered liquid a further quantity of this silver compound was obtained. After separating the silver from this compound by treatment with sulphuretted hydrogen and filtering, a

¹ It will be observed that several are done in duplicate, one on the leaf whole and the other on the powdered leaf. I thought it just possible the results might differ, as in the powder the proportion of veins from the leaves might be differently distributed. When bought powdered, the samples mostly contained more ash.

² *Berichte der deutschen chemischen Gesellschaft*, 1888, No. 11, p. 2164; reprinted from *Pharmaceutical Journal and Transactions*, July 21.

small quantity of xanthine was deposited from the clear filtrate,¹ and upon concentrating the liquid the new base partly crystallized out. The mother-liquor was then mixed with mercuric nitrate solution, the precipitate collected by filtration, and the filtrate made alkaline with sodic carbonate solution. A white precipitate was thus obtained in both cases, which consisted almost entirely of a mercury compound of the base.

Analysis of the new base, for which I suggest the name "theophylline," gave the following results :

	I.	II.	III.	Calculated for $C_7H_8N_4O_2$.
C . .	46.55	46.63	—	46.67
H . .	4.70	4.77	—	4.44
N . .	—	—	31.66	31.11

The crystals contain one molecule of water, which is given off by heating to 110° C.

The composition of theophylline is the same as that of theobromine, as well as that of paraxanthine obtained by Thudichum and Salomon from urine, but the characters of the base are different from those of either substance. The crystals are larger than those of theobromine, and the latter do not contain water. Theophylline is much more soluble in water than theobromine, and on the addition of a very small quantity of ammonia it dissolves very readily apparently in any proportion, while theobromine is but sparingly soluble in strongly ammoniacal water. The crystals of paraxanthine have been examined by Arzruni, and Dr. Scheibe has compared the crystals of theophylline with his description, with the result that they do not correspond. The melting point of theophylline is about 264° C., while that of paraxanthine obtained from Dr. Salomon is 280°.

¹ The occurrence of xanthine in tea was ascertained some four years ago by Dr. Adolph Baginsky, who undertook the search for it at the suggestion of Dr. Kossel (*Zeits. f. Physiol. Chemie*, viii., 395). For that purpose tea was extracted with dilute sulphuric acid, the clear liquor mixed with excess of baryta water and then treated with carbonic acid to remove the excess of baryta. After filtering and evaporating, ammonia and silver nitrate were added, and the precipitate of xanthine silver thus obtained, crystallized from solution in dilute nitric acid mixed with some urea. This salt contained 38.6 per cent. of silver, very nearly the amount required by the formula $C_8H_8N_4O_2AgNO_3$. The quantity of the silver compound obtained from one pound of tea was only 0.1567 gram.—*Ed. Pharm. Journ.*

Theobromine sublimes at 290° C. without melting. Theophylline also sublimes at a temperature above its melting point.

Theophylline forms definitely crystallizable salts with hydrochloric and nitric acids, platinum chloride and gold chloride, as well as a crystallizable sparingly soluble double salt with mercuric chloride. In a pure state the base is not precipitated from a dilute solution by mercuric nitrate.

Paraxanthine forms, as Salomon showed, a sparingly soluble compound with soda, which separates in crystals on adding caustic soda solution to a dilute solution of the base. Theophylline also forms a compound with soda, but it is readily soluble, this difference between the two bases being very marked.

Theophylline resembles theobromine in forming a silver compound which separates in an amorphous state on adding silver nitrate to a water solution of the base. This compound is soluble in warm ammonia, and on cooling the solution it crystallizes out. The compound thus obtained and dried at 130° C. contained 37.18 per cent. of silver, corresponding to the formula $C_7H_7N_4O_2Ag$. This silver compound dissolves readily in nitric acid.

When theophylline is mixed with chlorine water and the liquid evaporated, a scarlet-colored residue is left, which becomes violet on addition of ammonia, just as is the case with theobromine.

The great similarity between the characters of theophylline and theobromine suggest that these substances are both derivatives of xanthine, and with that idea the introduction of the methyl group was attempted. By heating the silver compound with a calculated proportion of methyl iodide and some methyl alcohol in a closed tube for twenty-four hours at a temperature of 100° C. a crystallizable product was obtained which showed on analysis that a methyl group had been taken up, the composition and characters agreeing perfectly with those of caffeine. The melting point of the substance thus obtained was 229° C., and accordingly from this experiment it may be inferred that theophylline is a dimethylxanthine. The positions of the methyl groups have yet to be determined by an oxidation experiment.

NOTE.—Theophylline is doubtless the same base which in 1871 was obtained in small quantity by Zoeller (*Annalen*, vol. 158, p. 185) from Himalayan tea, and which Liebig believed to be identical with theobromine, mainly because it yielded a crystallizable silver com-

pound. A second base has also been observed by Paul and Cownley shortly after the publication of their paper, "Chemical Notes on Tea," (*AMER. JOUR. PHAR.*, 1887, p. 626); the acid liquid from which the theine had been removed by chloroform, was rendered alkaline by potassa, and again shaken with chloroform, when a very small quantity of alkaloid was obtained, apparently amorphous, insoluble in hot water, but soluble in ether, and therefore differing from both theine and theobromine (*Phar. Jour. and Trans.*, July 14, 1888, p. 24).—
EDITOR *AM. JOUR. PHAR.*

PEPSIN.

BY A. PERCY SMITH, F.I.C., F.C.S., RUGBY.

The method usually adopted for estimating the peptonising power of pepsina porci consists in dissolving 1 to 2 grains in 8 to 12 ounces of water, to which 40 to 60 minims of hydrochloric acid has been added. 500 to 1000 grains of hard-boiled white of egg, granulated by rubbing through a wire sieve, is immersed in the liquid, and the whole kept at 98° to 130° F. for four hours, when the undissolved albumen is filtered off through muslin, and, after partial drying, is weighed to ascertain the amount dissolved. The variable numbers above quoted embrace various formulæ recommended by different experimenters.

This method of analysis is excessively crude and untrustworthy. When hard-boiled white of egg is kept in warm water it absorbs a considerable quantity of that menstruum, as much as several units per cent.; consequently, on weighing the residual albumen, you may find that the weight is greater, instead of less than that with which you started, the gain in weight due to absorbed water more than counterbalancing the loss obtaining through solution, as has happened with indifferent samples of pepsin. Then who shall say when, by simple air drying, the albumen has regained its former condition? The enormous quantity of albumen is foreign to the usual habits of the scientific analyst, and involves an enormous waste of time in manipulation.

One trial of this method was enough for me. The first modification I adopted consisted in substituting for the large quantity of granulated albumen a single half of the white of an egg in one piece. I likewise arranged a check experiment in which the pepsin was omitted, other conditions remaining unaltered. At the end of four hours the residual

pieces of albumen were placed on blotting-paper to remove superfluous moisture, and weighed. The gain in weight of the albumen in the check experiment, due to absorbed water, was calculated into percentage, and the same deducted from the weights of the other portions which had been subjected to the action of various pepsins. This, although an improvement upon the old method, proved likewise unreliable, because the water absorbed was not equal in each experiment. The albumen which was immersed in acidulated water only quickly dried, superficially, when placed on blotting-paper, whereas that which had been acted on by pepsin was rendered glutinous and incapable of being dried in this manner. In fact one sample weighed considerably more than it did at starting, even after deducting the allowance for water absorbed.

I next tried much smaller pieces of albumen, about 1 cc., in hope that complete solution might ensue, and a time value be obtained. I soon found, however, that the solubility does not depend upon the mass, but upon the surface exposed.

Finally I discarded altogether the use of fresh white of egg, and had recourse to dry powdered albumen, prepared by drying in a steam oven and levigation in a mortar. With this I succeeded in getting accurate comparisons between the digestive powers of various pepsins. Albumen in this form dissolves with rapidity, owing to its state of fine division. Any remaining undissolved can be filtered off on a counterpoised filter paper, and heated in a water oven until absolutely dry. It is, however, unnecessary to do this when two samples only are compared against each other, nor is it essential to know the actual weight of albumen employed, provided it be the same in each experiment. This is ensured by placing some on the naked pan of the balance (there is no objection to so doing, as it is a dry gritty powder, and does not adhere to the metal), and counterpoising by a similar addition to the other pan.

Let the albumen fall on the centre of the filtered liquid, avoiding, if possible, contact with the glass of the beaker. It soon sinks, and after the lapse of some time, a simple inspection will show which is dissolving with the greater rapidity. Agitation assists solution, therefore take the two beakers, one in each hand, and rotate the contents equally. When one sample has dissolved all the albumen it is manifestly superior to the other which has failed to do so in the given time. If many samples have to be compared it will be necessary to start with

known quantities of albumen, and weigh the undissolved residues in the manner above indicated.

An objection may possibly be raised to this modified method, viz., that albumen as ingested is not in the form of a dry powder, and that we ought to copy as nearly as possible the conditions existing in the stomach. To this I would reply that it does not matter in the least, to us, as analysts, what are the conditions which obtain in the stomach; since there is no absolute test for pepsin, we can only compare one sample against another, and that which dissolves the most albumen in the shortest time is taken to be the best.

Another imperfect method of analysis is that employed in the examination of malt extracts for diastase; in which a certain weight of extract ought to dissolve a certain weight of starch in ten minutes, when if it does so dissolve it, the extract is a good one, if not it is to be condemned. The more correct way is to ascertain the reducing power on Fehling's solution, before and after digestion with an *excess* of starch, and I intend to say a few words upon this subject on a future occasion, when I have ascertained the maximum amount of diastase existing in the best samples of malt.—*The Analyst*, Aug. 1888.

RELATIVE VALUE OF DIFFERENT PEPSIN TESTS.¹

BY JAMES H. STEBBINS, JR.

The methods I propose to discuss in this paper are three, viz.: the U. S. P. test, the Manwaring test and the Kremel test.

According to the experiments of numerous investigators, the peptic digestion of albuminoids depends upon several conditions.

1. The temperature.

The pepsin of fish acts energetically at 20° C., but the pepsin of mammals requires a higher temperature, and it has been found that peptonization is most active between 35° C.—50° C. Above this, digestion runs much slower and ceases totally towards 70–80° C.

2. The quantity of pepsin.

There being no such thing as absolutely pure pepsin, it has been impossible to determine, with accuracy, the amount of albumen which can be converted into peptone by a given quantity of the ferment.

¹ Abstract from a paper in *Journal of the American Chemical Society*, March, 1888.

We know only that the amount is very large, provided that from time to time a little acid and water is added in order to maintain a certain degree of dilution.

The quantity of albuminoid which can be digested in a given time increases rapidly with the quantity of pepsin employed till it reaches a maximum, and then decreases slowly. The quantity of peptone finally obtained increases with the proportion of pepsin.

3. The quantity of water.

As the products of digestion accumulate, the rate of peptonization gradually decreases. The addition of a fresh quantity of acidulated water causes the peptic action to recommence until it has reached a certain limit, beyond which the reaction ceases entirely.

4. The nature and quantity of the acid used.

A large number of acids may take the place of hydrochloric acid in peptic digestions, but none of them are as efficient as the latter. A. Mayer found that with the use of hydrochloric acid, complete peptonization occurred in from 3 to 5 hours; with nitric acid in about 5 hours, with oxalic acid in 13 hours, and with sulphuric acid in 19 hours.

According to Brücke, peptonization is already very active in a medium containing only 0.8 parts of hydrochloric acid per 1,000, and attains its maximum, with a concentration of 1 pt. of acid in 1,000 of water. A too large proportion of acid hinders peptonization, 7 pts. of acid per 1000 of water being sufficient to make the action very slow. Mayer thinks that the most favorable proportion of acid is 2 pts. per 1,000 water, or 0.2 per cent.

5. The time of action.

6. The variety and character of the albumen.

One of the most largely used tests in this country is the U. S. P. test, which reads as follows :

"One pt. of saccharated pepsin dissolved in 500 pts. of water, acidulated with 7.5 pts. of hydrochloric acid, should digest at least 50 pts. of hard boiled egg albumen, in 5 or 6 hours, at 100-104° F. (37.5-40° C.)"

The above test seems simple, but, in reality, it is unreliable and misleading, as no two persons using the same pepsin can obtain the same or even approximate results; it is, therefore, not surprising that we meet with such a diversity of conclusions.

The weak points in the above test are the following :

1. The test is based upon the amount of albumen which can be dissolved in a given time (including peptone and intermediary products); but does not take into consideration the amount of peptone actually formed, and this I claim to be of the greatest importance.

2. It directs that a given pepsin shall digest at least 50 pts. of coagulated albumen. Now, in order to determine how much albumen has actually been dissolved, it is necessary to use an excess of albumen, and then weigh what remains undissolved. The test in question does not specify how much albumen shall be used, but leaves it entirely to the option of the experimenter. I consider this to be a weak point, as it makes quite a difference whether only a small or large quantity of albumen is used.

3. It is difficult to see how accurate results are to be obtained by weighing the amount of undissolved albumen remaining after a digestion, because it is impossible to find two samples of coagulated albumen, which contain exactly the same quantity of moisture; and besides this, the quantity of moisture is very liable to vary during the weighing, owing to the loss of moisture by evaporation.

4. It is not stated how long the eggs should be boiled. This is a very important matter, as digestion differs greatly according to whether the eggs are boiled for a short or a longer time.

5. No provision is made for the size of the pieces of coagulated albumen. This, also, is very important, as it has been found that the greater the surface of the albumen exposed to the peptic ferment, the greater will be the amount of albumen digested.

6. This test applies only to saccharated pepsins, and no provision is made for other brands of pepsin.

It will, therefore, be seen that the U. S. P. pepsin test is absolutely unreliable and misleading.

Lately my attention has been called to a pepsin test, which I will designate by its author's name, the "Manwaring test." In this test Manwaring has tried to avoid as much as possible the bad points of the U. S. P. test; but in doing this he has stumbled against other sources of error which I will try to make clear further on.

The test can best be described in the words of its author :

"The design of the following mode of testing the dissolving power of pepsin is to conform as nearly as possible to the U. S. P. test, which, contemplating the testing of the saccharated form, makes no provi-

sion for the proportion of acidulated water to be used with a pure pepsin.

"On the basis that 1 part of a pure pepsin is capable of dissolving 1,000 times its weight of coagulated egg albumen in 6 hours, a saccharated pepsin made with a pure pepsin of U. S. P. strength would contain 5 per cent. of pure pepsin; therefore if 1 grain of a U. S. P. *saccharated* pepsin is to be tested in the presence of 500 grains of acidulated water, then 1 grain of a pure pepsin should be tested in the presence of 10,000 grains acidulated water, to equal the same proportion of water and acid used for the *actual* quantity of pure pepsin contained in a U. S. P. *saccharated* pepsin when tested according to the U. S. P."

In order to render the weighing of small quantities of pure pepsin as easy as possible to the pharmacist, Manwaring recommends that it should be saccharated, and for this purpose he gives the following recipe:

Ry. Saccharated pepsin consisting of:

Pure pepsin.....	1 gm.
Milk sugar.....	19 gm.

To make the test take of the above saccharated pepsin 0.3 gm. (=0.015 gm. pure pepsin).

Coagulated egg albumen.....	22.5 gm.
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Acidulated water consisting of:

Distilled water 100 cc.	}154 cc.
Hydrochloric acid U. S. P. 1.25		

The eggs are to be boiled for 15 minutes and the whites pressed (by means of a spatula) through a (preferably flat) 30 mesh sieve. For the sake of uniformity, the egg whites should be cut into small pieces and thoroughly mixed before being passed through the sieve.

The mixture should be maintained at 100–105° F. for six hours, and agitated thoroughly about every half-hour.

At the end of six hours the temperature of the bath should be quickly run up above 145° F. to destroy the pepsin, then the bath with contained bottles allowed to remain undisturbed over night, that the undissolved albumen may settle.

If the test bottle has been kept securely corked during the test, or

if by previously weighing bottle and contents and afterwards making up with water any loss from evaporation, the quantity of albumen dissolved may be easily determined as follows :

From the settled contents of the test bottle pipette off 10 cc. and evaporate to dryness—until weight is constant—in a watch glass. From this dry residue figure as follows (1 pt. of peptone or intermediate products representing 1 pt. of original albumen) :

Suppose 10 cc. of the liquid = 0.2 gm. dry residue ; $1\frac{1}{2}$ times its weight = the quantity of water contained in the 10 cc. that was derived from the albumen dissolved ; 10 cc. of liquid less 1.4 cc. of water leaves 8.6 cc. water taken from the 154 cc. of acidulated water in making the test.

1.6 grms. or 8 times 0.2 gm. dry residue = the quantity of albumen in its natural state as originally used, that has been dissolved in the 10 cc. of liquid evaporated to dryness.

Therefore, if 8.6 cc. acidulated water holds 1.6 gm. egg-albumen,
then 154 cc. “ “ “ 28.5 “ “

Then, as 0.015 gm. pepsin dissolved 28.5 grms. coagulated egg-albumen, 1 pt. would dissolve 1900 times its weight.

The use of the multiplier 7 and 8 is based on the fact that egg-albumen averages $12\frac{1}{2}$ per cent. or $\frac{1}{8}$ dry.

As will be seen, this test is quite a departure from the U. S. P. test, and in some respects is an improvement upon the latter, but I object to it on several points, viz.:

1. It makes no provision for other than concentrated, or, as Manwaring calls them, *pure* pepsins, while in reality the number of these is small compared to the saccharated pepsins.

2. The peptic principle is not killed at 145° F. = 62.2° C.; but digestion may and does continue up to 80° C.

3. Of the undigested albumen remaining in the test bottle, a little remains suspended in the liquid, is pipetted off and adds to the weight of the dry residue.

4. On evaporating the 10 cc. to dryness the residue chars owing to the free H Cl present.

5. The residue, not charred, is a mixture of undigested albumen, partly digested albumen and fully digested albumen or peptone. Peptone only being assimilable in the human system—not the intermediary products—the amount of true peptone formed indicates the strength of the pepsin.

6. The accuracy of the multipliers 7 and 8 is not infallible in every test.

As Manwaring lays particular stress upon the question of dilution, I think his test is a decided improvement over the U. S. P. test.

The next good point in his test lies in the fact that he does not attempt to weigh the undigested albumen, as is done in the U. S. P. test, and thereby does away with a great source of error; but instead of this he figures the amount of albumen (?) digested upon a dry basis, and then tries to convert this dry basis by calculation into albumen on the wet basis. In doing this errors are apt to occur as I have pointed out, but I do not think that they are errors of such magnitude as are apt to be obtained with the U. S. P. test.

Finally, I wish to say a few words about a test which I consider to be the only approach to an accurate method of testing pepsin that I know of. I do not claim that this test is absolutely accurate either, as slight errors are apt to occur, which, however, do not materially injure the final result. I refer to the Kremel test, which was published some time since in the Druggists' Circular.

In devising this test Kremel has made a radical departure from the usual methods, and bases his test upon the fact that under the conditions in which artificial peptic digestions take place, pepsin alone has the property of converting albuminoid matter into peptone, and that, therefore, from an analytical as well as from a physiological standpoint, the only correct method is to take the quantity of peptone produced as a gauge of the action of the pepsin; or in other words, the test is made to resemble as nearly as possible the conditions existing in the natural process.

Without going into any further detail, the test is made as follows:

One gm. of egg albumen (soluble) dried at 40°C. and pulverized, and 0.1 gm. of the pepsin to be tested, are placed into a 100 cc. flask, and dissolved in 50 cc. of 0.2 per cent. hydrochloric acid. The solution is heated to 38–40°C. for three hours, and then exactly neutralized with sodium carbonate; it is then heated on a water bath to 90°C., and cooled after coagulation has taken place. The flask is then filled to the mark with distilled water, and 50 cc. are filtered off and evaporated to dryness in a platinum dish on a water bath.

The residue is dissolved in hot distilled water, filtered through a

moist filter into a platinum dish, and the filter carefully washed. The solution is again evaporated to dryness and weighed. The peptone is then incinerated with ammonium carbonate, and the weight of the ash deducted leaves the weight of the pure peptone, or the representative of the digestive power of the pepsin.

The good qualities of the above test are the following :

1. Simplicity.
2. No guesswork, troublesome calculations or the use of questionable factors.
3. No weighing of albumen dissolved in hydrochloric acid, undigested albumen and intermediary products along with the peptone. This is all obviated by the use of soluble egg albumen, coagulation and filtration or removal of the undigested portion as detailed above.
4. The ease with which it is possible to duplicate and still obtain concordant results.

On the other hand, the objections to this process are the following :

1. The great difficulty of procuring absolutely pure soluble dried egg albumen. This source of error, however, in my opinion, is very slight, because in each test a large excess of albumen is always used, and consequently the pepsin always has enough albumen to act upon. Besides this it must be remembered that only the peptone formed is weighed, and not the amount of undigested albumen, as is the case with the U. S. P. test.

2. It may be objected to this test that the results obtained are expressed by the weight of peptone formed and not by the weight of albumen dissolved, and consequently the figures, being based upon dry peptone, will be much lower than when the result is expressed as so much moist or coagulated albumen. If this, however, be objected to, it is comparatively easy to obtain higher figures by a simple calculation. Assuming that the amount of dry peptone obtained is equivalent to so much dry albumen, then by multiplying the weight of the latter by 8 (Manwaring's multiplier) we would obtain the equivalent in coagulated or moist albumen. I do not think it necessary or advisable to follow this course, as it involves the use of a multiplier which, as already pointed out, is questionable.

3. It takes a little longer to make a test by this process, but if accuracy is thereby gained the process is to be preferred.

To further illustrate the test, I append the following results obtained with commercial pepsins :

		Peptone formed from 0.1 gm. pepsin in 8 hours.
Pepsin G.....		0.5844
" E.....		0.4972
" B.....		0.4722
" F, crystal.....		0.4682
" C (saccharated).....		0.4676
" H.....		0.4598
" A (saccharated?).....		0.4870
" A (saccharated).....		0.4246
" D plain, soluble.....		0.3470
" D pure, scales.....		0.3250
" D pure, another sample.....		0.3146
" I (saccharated).....		0.2780
" J French.....		0.1848
" K (saccharated).....		0.1738

These tests were all made with the same quantity of pepsin, whether the latter was saccharated or not, and I think are a fair indication of the relative values of the different pepsins.

It may be objected that this test does not do a concentrated pepsin full justice, on the ground that the latter would form a much greater proportion of peptone and thus retard if not completely arrest any further action of the pepsin upon the albuminoid matter.

In order to test this question, I saccharated samples of E, F and H respectively, according to Manwaring's directions, which is equivalent to diluting with mere acidulated water, and submitted them to the same conditions as before and obtained the following results :

		Peptone formed from 0.1 gm. pepsin in 8 hours.
Pepsin E.....		0.2620
" F.....		0.1240
" H.....		0.1250

It will be observed that in these tests the figures are considerably lower than in the former ones ; but it must be remembered that the pepsins with which the tests were made were twenty times weaker, or rather more diluted, than in the previous tests, and notwithstanding this the peptone formed is proportionally larger than before. This would clearly show that the dilution is beneficial in the case of concentrated pepsins, as it corrects the retarding action of peptone. As the dilution in these last tests was twenty times greater than in the

previous ones, we ought, by multiplying each of the above results by twenty, to obtain the amount of peptone which would be formed by using the pepsins in their concentrated forms, viz.:

	Peptone that should be formed from 0.1 gm. concentrated pepsin in 8 hours.
Pepsin E.....	5.240
" F.....	2.480
" H.....	2.500

The above figures are not, however, obtained as has already been shown, and therefore the calculation is erroneous.

As all the results obtained by strictly following Kremel's directions are comparable among themselves, I do not see how the process can well be improved upon.

The mere fact that increased dilution increases the yield of peptone is not, in my opinion, sufficient reason for condemning the process. As the conditions prevailing in the stomach of a full grown man do not differ materially as to dilution from day to day, it is safe to say that pepsins of varying strength administered to such a person will only perform a certain amount of work and no more, and that, consequently, the results obtained by this test more closely resemble the conditions prevailing inside the stomach than any other.

In conclusion, it will be seen that all the tests mentioned in this paper are subject to faults and imperfections, some having more than others; and, therefore, all we can do under the present unsatisfactory state of affairs is to select the one which is least objectionable, and this, in my opinion, is the Kremel test.

Condurango.—Professor Oser, of Vienna, who has been making trials of condurango bark in carcinoma and other diseases of the stomach, finds that it has an excellent effect on the appetite and that it relieves over-sensitiveness. Some patients can take it for months without any unpleasant symptoms, while in others it soon sets up nausea, which cannot be prevented either by the simultaneous administration of correctives or by the employment of different preparations of the bark, such as the vinum or the liquor. Condurango appears to Professor Oser to deserve a place in our materia medica as a symptomatic remedy, but as to its exerting any specific action on malignant disease, he still holds to his own dictum that the only hope of cure in cancer of the stomach by means of drugs lies in the possibility of a mistaken diagnosis.—*Jour. Am. Med. Assoc.*; *Lancet*, May 19, 1888.

ON THE ANTISEPTIC ACTION OF CHLOROFORM WATER¹.

BY PROF. SALKOWSKI.

The author has investigated, after Koch's methods, the degree to which chloroform water acts upon micro-organisms. He has used chloroform for some years to prevent urine decomposing before he had time to examine it. [I learnt to use it with the same object for albuminous liquids, when in Leipzig in 1882.] Chloroform prevents all fermentations which depend upon the growth of micro-organisms—e. g., alcoholic fermentation, ammoniacal fermentation of urea, conversion of hippuric acid by fermentation into benzoic acid and glyccol, lactic fermentation, and the putrefaction of albumins. But it has no action on those processes caused by unorganized ferments, as ptyalin, pepsin, etc.

Milk, to which has been added a little chloroform, kept in a well-corked bottle, keeps its alkaline reaction, but at the end of three months changes to a fine jelly, which, by shaking, forms a white sediment of casein and fat, and a yellowish clear liquid. Sterilized milk behaves in the same manner, which Meissner explains as due to a slowly acting curdling ferment. Cane-sugar and grape-sugar along with chloroform do not ferment with yeast, but next day the cane-sugar is converted into invert-sugar, by an unorganized ferment in the yeast. Albuminous transudations and pounded meat remain sweet when treated with chloroform, and are found to be free from organisms, both by the microscope and by inoculating gelatin and other nutrient media.

Further, chloroform not only hinders the development of micro-organisms, but also brings about their destruction. Thus a stinking meat broth, shaken up with a few drops of chloroform, at the end of an hour was quite sterile.

Silk threads, impregnated with anthrax-bacilli, free from spores, and exposed to chloroform water for 24 hours, failed to inoculate gelatin plates, etc., whilst in control experiments a positive result was obtained. Mixtures of chloroform water and crushed spleens from cases of splenic fever were found to be sterile after standing 30 minutes. Guinea-pigs were inoculated with half a Pravaz's syringe-full of a fluid, composed of one drop of anthrax blood and 8 cc. of sterilized

¹ *Deutsche medicinische Wochenschrift*, No. 16, 1888; reprinted from the *Medical Chronicle*, August.

water or chloroform water. All the animals died within 48 hours when water alone was used, and the others which had been treated with chloroform water and anthrax blood remained quite healthy. The reagent had no action on the *spores* of anthrax.

The action on comma bacilli is so energetic that a fresh cholera cultivation, mixed with an equal volume of chloroform water, is disinfected at the end of a minute. The proof of this is that one fails to get any growth in peptone solutions, gelatin, and so on. This property of chloroform is of great use in the laboratory to keep urea solutions, aqueous solutions of various ferments, pathological fluids, and in artificial digestive experiments, especially with trypsin. [It will be useful to add a few drops of chloroform in preparing artificially digestive foods for patients, provided the vessel be kept well closed. The objectionable bitter taste will not be developed, and if the taste of the chloroform be objected to, it can be removed by a few minutes' boiling.] Also, chloroform water can be used instead of glycerin to make solutions of various ferments, as pepsin, trypsin, etc. [The use in pharmacy will strike every practitioner. I have used it, instead of rectified spirit, for keeping solutions of alkaloids, and also in the preparation of infusions.] It is a useful and cheap preservative for anatomical preparations, though it gradually becomes colored with hæmoglobin. This might be prevented in various ways, either by laying the specimen in strong alcohol for a short time previously, or by combining it with Grawitz's fluid. [Also by previously washing out the blood in a stream of water.]

Other uses are :—(a). To prepare solutions for subcutaneous injection ; (b) to employ it internally in diseases of the digestive organs depending on the presence of micro-organisms ; amongst others, cholera. [Possibly the benefit that many patients derive from stomachic mixtures containing chloroform water as the vehicle is due to its destructive action on various micro-organisms.] Salkowski gave a dog (36·8 kilos.) 200 cc. (about 6½ ounces) of chloroform water with its food for four days without producing any effect, so that in the treatment of a disease like cholera large quantities of chloroform water might be given. The author recommends it as a mouth wash. [For surgical purposes it is not adapted, because of the ready volatility of the reagent, but it might be useful for irrigation in cases of puerperal pyrexia and deep abscesses, though its effect on staphylococci is not yet known.]

A. JASPER ANDERSON.

MINUTE OF THE COLLEGE MEETING.

A stated meeting of the members of the College was held June 25th, at 4 P. M. Chas. Bullock, presiding—Seventeen members were present. The minute of the last stated meeting was read, and adopted, on motion. The minutes of the Board of Trustees for April, May and June, and the minute of a special meeting of the Trustees held were read, and as usual approved.

The action upon the cases of members reported, by the Treasurer as in arrears in annual payments, which was deferred from the last meeting, being again brought forward—it was on motion resolved to drop from the roll two names.

On motion, being offered by Dr. C. B. Lowe, it was resolved that the College appropriate a sum not exceeding fifty dollars to defray the incidental expenses incurred by the College Committee on the revision of the Pharmacopœia.

An election of delegates to the session of the American Pharmaceutical Association to be held in Detroit in September next being ordered, Prof. J. P. Remington, Chas. A. Heinitch, of Lancaster, Jos. L. Lemberger, of Lebanon, Gustavus Pile, and William McIntyre were declared duly elected.

A report upon the character of the recent meeting of the Pennsylvania Pharmaceutical Association held at Titusville in June being asked for—the following verbal statement was made. "The meeting was larger in numbers than anticipated—the interest was fully maintained in the number of papers presented, and in the discussions—an accession of between 40 and 50 members being made to the roll of the Association—the social features formed as usual an attractive part of the enjoyment."

No other business being presented an adjournment here prevailed.

WILLIAM B. THOMPSON,
Secretary.

PROCEEDINGS OF STATE PHARMACEUTICAL ASSOCIATIONS.

The Georgia Pharmaceutical Association held its thirteenth annual meeting in the House of Representatives, Atlanta, July 11, President, G. W. Case in the chair. An address by Mayor Cooper, the president's address, and the reports of various committees occupied the first day's sessions. One of the most important steps taken was the action in regard to the establishment of a School of Pharmacy in Atlanta.

During the second day, when a number of papers were read, the sessions were held in the Sweet Water Park Hotel, at Piedmont, Chautauqua, where also the next annual meeting will be held on the second Tuesday of July, 1889.

Mr. W. S. Parks of Atlanta was elected president; the secretary and treasurer were re-elected.

The *Ohio Pharmaceutical Association* met at its tenth annual meeting at Columbus, June 12 to 14, and was welcomed by Mayor Bruck. The address by President S. E. Allen, and the reports of officers and committees were presented and disposed of. A number of papers were read and discussed, and several questions of trade interest received attention. Dr. A. B. Lyons who was present as a representative of the Michigan State Association, spoke warmly in favor of a joint meeting of the two associations, for which purpose Put-in-Bay would be admirably adapted. M. D. Fulton, of Bucyrus, was elected president for the ensuing year, and L. C. Hopp and Charles Huston were re-elected secretary and treasurer respectively. The next meeting will take place at Mansfield, on the first Tuesday of June, 1889.

The *West Virginia Pharmaceutical Association* met at Clarksburg, June 20th, President McWhorter in the chair. An address of welcome by Mayor Lee, the president's annual address, the reports of officers and of committees, and the reading of several papers occupied the attention of the meeting. The president, secretary and treasurer were re-elected officers for the ensuing year.

The following printed Proceedings have been received :

Kansas.—Pp. 129. See July number, p. 376.

Louisiana.—Pp. 113. See July number, p. 376.

Nebraska.—Pp. 124. See July number, p. 377.

New York.—Pp. 232. See August number, p. 426.

Pennsylvania.—Pp. 170. See July number, p. 378.

EDITORIAL DEPARTMENT.

THE ORIGIN OF PETROLEUM.—In the interesting address by Mr. A. H. Samuel, published in our April number (pp. 187–197), there will be found a concise review of the various theories which have been advanced in explanation of the origin of petroleum. Against the formation of this natural product from organic material a weighty objection had been advanced pointing to the fact that, if petroleum really were a distillation-product of organic matter, the residues which should have remained of such matter had never been found. The weight of this argument has been considerably reduced by the results of experiments made by C. Engler in the laboratory at Karlsruhe, and reported in *Berichte der Deutschen Chemischen Gesellschaft*, 1888, pp. 1816–1827. We cannot follow the arguments of this interesting essay, and must content ourselves with a few brief references.

Referring to the views of various scientists who, for either chemical reasons, or for geological considerations, insist upon the formation of petroleum at a comparatively low temperature, but under a high pressure, the author had occasion to distil under such conditions a large quantity (492 kilos) of American fish oil, the pressure being gradually reduced from 10 to 4 atmospheres, while the temperature was increased from 320° to a little over 400° C. The products consisted of inflammable gases, of a watery liquid, and of an

oily portion amounting to about 60 per cent. This portion is described as brownish, in thin layers transparent, fluorescent with a green color, and of the specific gravity 0.8105; the odor is not unpleasant, and is free from the pungency of acrolein. It has as yet been only partially examined; but the hydrocarbons pentane, hexane, heptane, octane and nonane have been obtained from the lower boiling fractions.

Similar results, without carbonaceous residues, are obtained from olein and stearin if heated in sealed glass tubes of which the branches for condensation are bent downward, and are not immersed in the bath. These fats, and more particularly the fat acids, are of such composition, that if the oxygen be removed through combination with the requisite hydrogen for the formation of water, the remaining carbon and hydrogen will be in the proportion very nearly of 87:13, which is also the proportion of these elements in petroleum. Assuming that petroleum originates from the fat of fossil marine animals, the absence of acrolein and the lower fat acids may be explained by their removal with water, and carbonaceous residues cannot exist, because none were formed. Attention is also drawn to the durability of fatty substances in nature through the formation of adipocire. The presence of nitrogen compounds in some rock oils is also regarded as an indication of the origin from animal fat residues.

Explosive Mixture.—A serious accident happened in Topeka, Kansas, on the morning of August 14th, when Dr. Detlor, a veterinary surgeon, attempted to powder in an iron mortar a quantity of saltpetre and sulphur. On striking the mixture with an iron pestle a violent explosion took place, shattering the mortar and resulting, besides serious damage to property, in the wounding of the operator, whose left hand was completely blown off, the right hand pierced and mutilated, and a leg and other parts of the body lacerated. Several other persons were more or less seriously injured and a horse on the opposite side of the street was wounded.

An *International Congress of Hydrology and Climatology* is to be held in Paris, France, in 1889, the precise date to be announced hereafter. The director of the meteorological observatory of the Parc du Saint-Maur, Mr. E. Renou, is president of the committee, and Dr. F. de Ranse, Paris, is general secretary. Both national and foreign members are required to pay a contribution of 12 francs. The questions which have thus far been proposed for discussion are as follows:

a. Scientific Hydrology.

1. The precise determination of the temperature of thermal springs.
2. Micro-organisms in mineral waters, and their influence upon the composition and properties of the latter.
3. Influence of bacteriologic discoveries upon thermal therapeutics.
4. Program of the study of hydrology.

b. Medical Hydrology.

The questions refer mostly to the use of thermal and other mineral springs in the treatment of diseases of the heart and blood vessels, of kidney diseases, neuralgias, some forms of tuberculosis, etc.

c. Climatology.

The proposed questions embrace the conditions for the organization of meteorological observatories; climatology of sanitary stations, their comparison and classification; influence of the climate of high localities upon pulmonary affections, and of maritime climates upon tuberculosis.

The Chicago College of Pharmacy held its summer commencement in the Grand Opera House, July 31st; one lady and thirty-two gentlemen graduated. Addresses were made by Hon. B. R. Smith, T. W. Sanders, W. K. Forsythe, and Professors Bastin and Garrison.

The University of Michigan had its annual commencement June 28th, when twenty-three persons, including one lady, graduated from the School of Pharmacy as Pharmaceutical Chemists.

Hair Tonic.—Quinine sulphate 60 grains; oil of cajeput 2 drachms; attar of rose 10 drops; bay rum 1 pint; lanolin $\frac{1}{2}$ ounce. To be applied to the scalp with vigorous brushing twice a week.

Numerous formulæ of a similar character are in use. The above was prescribed under the supposition that a perfect solution would be formed, which is impossible owing to the insolubility of lanolin in the bay rum. Similar hair tonics are sometimes made with a stronger alcoholic menstruum and sufficient castor oil to form a clear solution at ordinary temperatures; and chinoidine or alcoholic extract of cinchona is used in place of quinine.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Annual of the Universal Medical Sciences.—A yearly report of the progress of the general sanitary sciences throughout the world. Edited by Charles E. Sajous, M. D., lecturer on Laryngology and Rhinology in Jefferson Medical College, Philadelphia; and seventy associate editors, assisted by over two hundred corresponding editors, collaborators and correspondents. Philadelphia and London. F. A. Davis, publisher, 1888.

The first issue of this annual makes its appearance in five handsome octavo volumes, of about 550 pages each. Its early publication was made possible only through official collaboration by a large number of competent men. The subject matter reported upon is necessarily classified according to diseases, or rather classes of diseases, and each head is intended to contain all the observations made on the subject during the preceding year. That this intention has been carried out, may be inferred from the names of the editors, printed upon seven pages of the preliminary portion in the first volume. The work is printed with clear types upon heavy paper and is illustrated with numerous wood cuts, chromolithographs, maps, etc.

Aside from the completeness and reliability of the work due to the care of the collaborators, it has several peculiar features, which facilitate its use. Thus, the table of contents of each volume is found upon the back of the cover; and the index to the whole work has been made in three columns, the first of which gives the general references while in the second are found therapeutical observations and suggestions, and in the third column the names of authors quoted in connection with the general subjects.

This annual will doubtless become an important repository of the researches, observations and progress in the various departments of the medical sciences.

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Vol. 60

AMERICAN

No. 10

JOURNAL OF PHARMACY.

PUBLISHED BY AUTHORITY OF THE

PHILADELPHIA COLLEGE OF PHARMACY.

Under the supervision of the Publishing Committee, consisting of

HENRY N. BITTENHOUSE, JAMES T. SHINN, CHARLES BULLOCK, T. S. WIEGAND,

AND THE EDITOR

JOHN M. MAISCH.

Price, \$3.00 per Annum,
in advance. }

{ Issued in Monthly numbers of
not less than 48 pages.

Single No. } Fourth Series, 3 OCTOBER, 1888. Vol. XVIII., No. 10
36 cts.

CONTENTS.

Analysis for Adulteration of Commercial Pepper. By James Edgar Stevenson Bell, Ph. G. 481
Composition of Precipitated Ferrous Sulphate. By Henry Trimble 485
Mayer's Reagent for the Estimation of Alkaloids. By H. W. Snow, Ph. C. 487
Catechu and Gambier. By Henry Trimble 497
Note on Star Anise. By E. M. Holmes, F. L. S. 502
Shellac. By R. Benedikt and E. Ehrlich. 504
Mode of Formation of Gums and Gum-Resins. 505

The Furfuraldehyde Color Reaction L. v. Udransky 506
Detection of Impurities in Commercial Alcohols. By L. Godefroy 509
Gleanings from the German Journals. By Frank X. Moerk, Ph. G. 513
New Formulæ from the Unofficial Formulary, B. P. C., 1888. 516
American Pharmaceutical Association . 520
British Pharmaceutical Conference . . 532
Reviews and Bibliographical Notices . 542
Obituary 544

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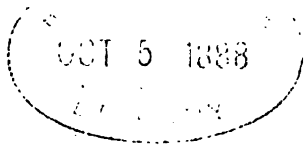
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THE AMERICAN JOURNAL OF PHARMACY.

OCTOBER, 1888.

ANALYSIS FOR ADULTERATION OF COMMERCIAL PEPPER.

BY JAMES EDGAR STEVENSON BELL, PH. G.

From an Inaugural Essay.

The belief that most of the spices in common use as condiments are largely adulterated is quite prevalent and rapidly gaining ground. This is especially true with regard to the most familiar and largely used of all, *black pepper*, which, owing to its color and structure, is easily adulterated. It is very important that all articles used as foods or in connection with them should be as pure as possible, and it was with a view of determining whether the popular belief is true with regard to the familiar spice named, that the writer undertook the examination herein described. In order to make the results as representative and reliable as possible the samples were obtained from widely separated sources. Eleven of the samples were procured by friends in the respective cities named in the *table of results*, and forwarded by mail. They were bought in grocery stores in the ordinary course of trade, the object being to get a fair average of the brands in common use throughout the country. The remaining samples were procured here.

Of the twenty samples employed, all were examined both chemically and physically.

The important constituents of pepper are an alkaloid (piperine), the volatile oil, and the resin, and upon these ingredients its value as a condiment depends. It was not deemed necessary for the purpose in view to separate the piperine and resin, nor was it considered important to estimate the volatile oil which was allowed to escape during evaporation. The figures indicating the percentage of moisture are consequently slightly in excess, as they include the entire loss sustained by the ethereal extract in evaporation.

The object of the chemical examination was to determine the percentage of piperine and resin, moisture, and ash, and its proximate constituents.

CHEMICAL EXAMINATION.

1. *Moisture.* Ten grammes of each sample were dried in an air-bath at 100° C. until there was no loss in weight.

2. *Piperine and Resin.* Ten grammes of each sample were exhausted with stronger ether (Squibb's), the extract evaporated in tared evaporating beakers, and weighed.

3. *Ash.* Two grammes of each sample were incinerated in weighed crucibles, and the weight obtained. The several ashes were treated with hydrochloric acid, the solution filtered, hydrogen sulphide passed through it, and further treated with ammonium sulphide. None of the filtrates gave any appreciable coloration or precipitate with the former reagent, nor did the precipitate by the latter indicate an undue amount of iron.

The results of the above examination, together with the source whence each sample was obtained, are embodied in the following table.

TABLE SHOWING SOURCE AND RESULTS OF ANALYSES OF TWENTY SAMPLES OF BLACK PEPPER.

No.	Where Ground or Obtained.	Moisture.	Ash.	Piperine and Resin.	Remarks
1.	Philadelphia, Grinder,	9.90	4.50	7.85	Pure.
2.	London, Eng., Grocery.	9.08	5.48	6.75	"
3.	Boston " "	10.69	5.02	6.46	"
4.	New York " "	10.29	4.98	6.84	"
5.	Philadelphia " "	11.81	5.39	6.02	"
6.	" " "	11.34	7.92	4.27	Adulterated.
7.	Baltimore " "	12.25	7.37	4.11	"
8.	" " "	11.02	5.17	5.83	Pure.
9.	Pittsburgh " "	10.78	4.91	5.98	"
10.	Chicago " "	9.46	5.90	6.54	"
11.	San Francisco " "	10.12	5.12	6.89	"
12.	" " "	10.63	4.93	7.29	"
13.	Los Angeles " "	10.86	4.63	6.96	"
14.	" " "	9.21	4.92	7.18	"
15.	" " "	9.53	4.65	7.08	"
16.	Philadelphia Drug Store,	10.14	4.87	6.98	"
17.	" " "	9.91	5.37	7.18	"
18.	" Grocery,	9.01	6.75	6.45	"
19.	" " "	12.60	7.25	3.74	Adulterated.
20.	" " "	11.93	8.59	3.29	"

An examination of this table shows :

(a) That pure pepper may contain from nine to twelve per cent. of moisture.

(b) That the amount of ash in pure pepper ought not to exceed six per cent.

(c) That pure pepper contains from five to eight per cent. of piperine and resin, and that less than 4.5 per cent. is evidence of sophistication.

Authorities differ widely upon the relative amounts of the above constituents. The extremes given are:

Piperine and resin.....	5.25 to 8.15 per cent.
Moisture.....	9.22 to 14.36 "
Ash.....	4.35 to 8.89 "

Niederstadt says that genuine black pepper should yield 7.66 per cent. of *piperine*. This is certainly in excess of the amount usually obtained, and a sample not reaching this limit is not necessarily impure. Probably from 4.5 to 5.5 per cent. is nearer correct. It should be remembered that the source from whence the pepper was originally obtained, as well as the conditions to which it has been subjected after being taken from the plant, have much to do with the results of a chemical determination; for pure peppers differ considerably in their important constituents, especially if, after curing, they have been subjected to varying conditions. The appearance of the evaporated ethereal extract must be carefully noted, as it affords an excellent clue to possible adulteration. It should be dry, somewhat scaly, and the resin should show numerous projecting crystals of piperine. If it has a dark, oily appearance and is mostly amorphous, adulteration is indicated.

All peppers, whether pure or not, contain more or less sand, and the excess in weight of ash in some of the samples containing the normal amount of piperine and resin is attributable to sand, since in each case there was a sufficient amount of insoluble residue after treating with hydrochloric acid to account for it. No determination of starch was made, since the ingredients used as adulterants frequently contain more starch than the pepper itself; hence such a determination would be of doubtful value.

Physical Examination.—This mode of examination is absolutely essential to a thorough analysis of pepper, since many of the impurities are much better detected by it than by chemical tests. The examiner must familiarize himself with the structure of pure pepper and

with that of the various adulterants used in order to be able to recognize them with the aid of a microscope. This is not specially difficult if one has had some practice in manipulating a microscope and in mounting sections. The excess of moisture and ash, and the deficiency in the amount of ethereal extract, as well as the appearance of the latter, in Nos. 6, 7, 19 and 20, being sufficient to render them suspicious, they were subjected to a further *physical* examination. No. 1, which was obtained from a well-known and reliable grinder in this city and known to be pure, was taken as the standard in this as well as in the chemical examination. Samples of each were sifted successively through No. 40, No. 50 and No. 60 sieves, and the portions thus separated subjected to a careful microscopic examination, which revealed a number of abnormal structures, among which were detected pepper stems, charcoal, hulls of mustard seeds, ground corn and beans, small fragments of cocoanut shells, and various unrecognizable impurities. The impurities found were chiefly inert, and while objectionable on account of their diluent effect as well as for other reasons, were not specially deleterious. All the other samples were similarly examined but nothing abnormal was found.

Conclusions.—The conclusions I have drawn from the foregoing analyses are

1. The amount of moisture in pepper is so variable that it alone is no criterion by which to judge of the quality of a given sample.

2. The ash is also a variable factor, and, unless quite excessive, is not a sufficient indication of impurity.

3. Excess of either ash or moisture, coupled with a marked deficiency of ethereal extract (piperine and resin) is a good indication of impurity.

4. The impurities most likely to be met with in peppers ground in this country are those mentioned above, which are either inert or harmless.

5. Metals and alkaline earths are, as a rule, present only to a slight extent.

6. An expertly conducted physical examination must accompany the chemical in order to *thoroughly* test a sample of pepper.

7. The popular notion that ground peppers are extensively and grossly adulterated, while partly true, is mainly a false one.

8. Consumers who are willing to pay a fair price for pepper will seldom be imposed upon with an adulterated article.

COMPOSITION OF PRECIPITATED FERROUS SULPHATE.¹

BY HENRY TRIMBLE.

QUERY No. 7.—Is the precipitated sulphate of iron of constant composition? Does it contain the same proportion of water of crystallization as the large crystals?

As inquiry at several stores in Philadelphia revealed the fact that this officinal preparation is not usually kept in stock, I made the experiments on four samples prepared by myself. No. 1 was made according to the U. S. P. No. 2 according to the Br. P., with the quantity of water reduced to twenty per cent., and without boiling the solution. No. 3 according to the proportions of the Br. P., omitting the boiling; as this solution was quite dilute, the yield was small. No. 4 was made exactly according to the directions of the Br. P. This authority directs that the solution be boiled for ten minutes in an open dish, but leaves one in doubt whether to take into account the loss by evaporation or not; therefore if the strength of the solution and consequently the proportion of alcohol affect the composition, it will be shown by samples 3 and 4. The directions for getting rid of adhering moisture and acid are not so exact as our own, consequently a slight excess of acid will be found in the Br. P. samples. In the following results, the amount of iron was determined by both gravimetric and volumetric methods, the latter being by titration with potassium permanganate. The results by the two methods were not materially different. The sulphuric acid was determined by barium chloride.

	No. 1. U. S. P.	No. 2. Br. P. less 20 p. c Water, not boiled.	No. 3. Br. P. Not boiled.	No. 4. Br. P.	No. 5. Larger Crystals.	Theoretic- cal.
Fe.....	20.48 p.c	20.86 per cent.	20.35 p.c.	20.37 p.c.	20.53 p.c.	20.12 p. c.
SO ₄	35.40 "	35.84 "	35.40 "	35.44 "	36.40 "	34.54 "
H ₂ O.....	44.12 "	43.30 "	44.25 "	44.19 "	43.07 "	45.34 "
Total.....	100.00	100.00	100.00	100.00	100.00	100.00

¹ Read at the Detroit meeting of the American Pharmaceutical Association; communicated by the author.

No. 5 settled out from the filtrate of No. 3, which was more dilute than the others and therefore contained a larger quantity of the salt. The deposit took place during three weeks, in granular crystals much larger than in the other samples.

None of the specimens when first made gave more than slight indications of ferric iron and the determinations by potassium permanganate failed to indicate any appreciable quantity. The above results are sufficient to show that the salt precipitated under different conditions is of constant composition.

This is contrary to the results gotten by Barkhausen (*Archiv der Pharmacie*, Band 148, 1871), who found it to contain less than $7\text{H}_2\text{O}$, and to lose moisture rapidly on exposure to air. His results may be attributed to the method used in analysis (with calcium hypochlorite), or to over-drying the salt in its preparation.

L. Caro (*Liebig's Annalen*, 165, 29) contradicted these statements and found the salt to contain $7\text{H}_2\text{O}$, and to remain of the same composition after a month's exposure to the atmosphere. While I can agree with the first part of Caro's statement, which has also been verified by Tilden (*Phar. Jour. and Trans.*, 3, 11, p. 1026), it is difficult to believe that this salt will remain unchanged for a month when exposed to the atmosphere.

To investigate this, portions of samples 1, 2, 3 and 4 were placed on filter paper loosely covered with the same, and exposed to the air in a room without artificial heat, well ventilated, with a temperature varying between 55° and 90° F. (13° and 32° C.) for a month.

As the change appeared to be on the surface the samples were well mixed and bottled. The ferrous and total iron were estimated by titration with potassium permanganate, with the following results:

	1.	2.	3.	4.
Fe. as ferrous.....	20.92	21.86	21.74	21.72
Total Fe.....	21.12	21.86	21.74	21.92

By calculation we get the following percentages of water: No. 1, 42.45; No. 2, 40.67; No. 3, 40.94; No. 4, 40.28.

It will be seen that oxidation took place in two of the samples only,

and even in them it was almost insignificant, but that there was a loss of about four per cent. of water, which is almost the equivalent of one molecule.

A sample which had been kept in a glass-stopped bottle for several years was also examined and found to have the composition of the officinal salt; the bottle had been frequently opened for the removal of a portion of its contents, and at the time of the examination was nearly empty.

Precipitated sulphate of iron, then, is of constant composition, and is the same as the large crystals; it keeps well in glass-stopped bottles, but loses water, and is slowly oxidized on exposure to the atmosphere.

Philadelphia, July 16, 1888.

MAYER'S REAGENT FOR THE ESTIMATION OF ALKALOIDS.¹

By H. W. SNOW, Ph. C.

Two years ago Dr. A. B. Lyons presented to this Association a paper on the estimation of alkaloids by Mayer's Reagent, which is, I believe, the most exhaustive and thorough paper ever published on this subject. In fact, it is my opinion that comparatively little remains to be said; at least so far as immediately practical results are concerned, and, consequently I feel some hesitation in travelling again over the same ground, particularly as the experiments performed by me have been far more limited in number than those from which Dr. Lyons drew his conclusions. It is, therefore, well to say at once that this paper is intended more particularly to draw attention to a method of interpreting the results of titrations, rather than with the expectation of advancing any new and hitherto unknown facts bearing on the use of this reagent. In your proceedings of last year in connection with the assay of ipecac, and again at a later date, in connection with the assay of aconite in the *New Idea*, I gave tables for the interpretation of the results of titrations of the alkaloids contained in those drugs, and it is these tables, somewhat extended and similarly applied

¹ Read before the Michigan State Pharmaceutical Association, at its meeting in Detroit, September, 1888, and communicated by the Author.

to a number of alkaloids, that I wish to again bring forward in a paper immediately upon the subject of Mayer's reagent. The experiments which form the basis of this paper have been performed at odd intervals during a year or more past, and were primarily undertaken with a view of familiarizing myself to some extent with the peculiarities exhibited by the different alkaloids on treatment with Mayer's reagent. The experiments, though not bringing forward much that is new, may stand in some measure at least as confirmations of earlier work, and thus give increased value to that which has preceded. The method of interpreting the results of titrations is very simple, and consists, first, in determining the titration equivalents for alkaloid in different degrees of dilution. Then, when working on unknown material, by holding the dilution of the initial fluid always constant, the number of cubic centimeters of reagent required to precipitate the alkaloid becomes an index to the degree of dilution of the alkaloid, and thus enables the analyst to select the true experimental equivalent for calculating the weight and, finally, the percentage of alkaloid. The full details of calculating the tables are most easily understood by following out the actual on an alkaloid, and this work is given for the sake of illustration in the case of aconitine.

MANNER OF USING TABLES.

The manner of using the tables is the same for all the alkaloids, and in illustration let us take aconitine. Bring the volume of fluid containing the alkaloid to the volume indicated at the head of the table, in our instance 20 cc., titrate with the reagent, and as hereinafter described, and note the amount required to completely precipitate the alkaloid. Suppose that from 10 grammes of aconite root the alkaloid required 4.8 cc. reagent, referring to the first column of our table we find that this indicates a dilution of 1 part in 300, and that the experimental equivalent for the alkaloid in that degree of dilution is .014 then $(.014 \times 4.8) \times 10 = 0.67$ per cent. alkaloid. Instead of 4.8 cc. suppose that 6.3 cc. had been required. Again referring to the table, we note that this indicates a dilution between 1 part in 200 and 1 part in 250, and the equivalent to use in the calculation might be taken for either degree of dilution, or if for any reason we desired to split hairs .01415 might be taken as the

average between .0142 and .0141, this would give us a percentage of $(.01415 \times 6.3) \times 10 = 0.89$ per cent. alkaloid.

THE REAGENT.

All titrations and tables in this paper refer to a solution containing 6.775 grammes of mercuric chloride and 25 grammes of potassium iodide to the litre (N), and is consequently a solution of half the strength of that originally recommended by Mayer.

METHOD OF TITRATION.

As the method of titration in some instances at least influences the results, it is recommended that all who may use these tables should pursue the following convenient course.¹ Run in from $\frac{1}{2}$ to 1 cc. of reagent, after stirring allow to stand one or two minutes before again running in a like quantity, and as before, after stirring, allow to stand a minute or two, finally as it becomes apparent that the end of the reaction is nearly reached the fluid is to be passed through a small dry filter paper, best of a size to just conveniently hold all of the liquid, allowing most of the fluid to pass through before again testing with a drop of the reagent. The final end is best determined by taking out four or five drops of the filtrate in a watch glass placed on a dark surface and adding one drop of the reagent. If a precipitate does not appear on standing half a minute or so the end may be considered as reached. If a precipitate does appear the fluid is to be returned to the main portion and the operation continued.

ACONITINE.

The writer reported a number of experiments some time ago on this alkaloid.² Results of titrations are on the whole very satisfactory, and the end reaction is quite distinct and well marked. The alkaloid may be regarded as belonging on the list of those for which Mayer's reagent may be used advantageously as a means of estimation. Experiment shows each cc. of the reagent precipitates in faintly acid solutions amounts as follows for different degrees of dilution:

¹ The method of A. B. Lyons slightly modified for the determination of the final end.

² Pharm. Era, ii-20 from New Idea, Oct. 1887-616.

1 in 200.....	0142
1 in 300.....	0140
1 in 400.....	0138
1 in 500.....	01286
1 in 600.....	01163

The precipitates from 0.100 of alkaloid, when collected, dried and weighed, ran from 0.162 to 0.179, with an average of 0.173 corresponding to 55.9 per cent. to 61.7 per cent., with average of 57.8 per cent. alkaloid. It is observed that aconite root and fluid extracts of the drug contain not far from 0.75 per cent. alkaloid as an average estimated as aconitine. Occasionally the amount will exceed one per cent. and rarely fall below $\frac{1}{2}$ per cent. It will also be noted that for dilutions of one part in 200 to one part in 300 the alkaloid gives the best results in titration, while for less than one part in 400 the results begin to vary considerably. It is therefore evident that a dilution should be adopted in which the alkaloid should be present in from one in 200 to not less than one in 400, and in the case of fluid extracts this dilution would be 20 cc. representing 10 cc. of fluid extract and therefore this dilution was adopted.¹ The figures in the table were obtained as follows: A fluid measuring 20 cc. may be said to weigh 20 grammes. If it contains one part in 200 of alkaloid it is evident that there is 0.100 grammes ($20 \div 200 = 0.100$) of alkaloid present in it. In a dilution of one in 200 Mayer's reagent precipitates 0.0142 of alkaloid and 7.04 cc. ($0.100 \div 0.0142 = 7.04$) of reagent are required to precipitate the whole of the alkaloid. This gives the figure for the first column, the equivalent goes into the third column, while the degree of dilution makes up the second column. For one in 500 a similar course is followed, not forgetting that in dividing the weight of the alkaloid by the equivalent we must use the equivalent for one in 500 and not for one in 200 as in the first case and this is true for all the data in the first column. By following this course it is easy to see how the first column becomes an index to the degree of dilution and enables the analyst to select the proper equivalent for his calculations.

On this basis the following table has been constructed for the interpretation of the results of titration:

¹ 10 cc. of a fl. ex. or 10 grammes of a drug containing 1.00 per cent. alkaloid would yield when diluted to 20 cc. a fluid containing one part in 200 of alkaloid. If it only contained $\frac{1}{2}$ per cent. alkaloid this would correspond on diluting to 20 cc. to a fluid containing one part in 400, and it will thus be seen that the range is the one best suited to determinations of the alkaloid.

Fluid measures 20 cc.¹ and contains 2 cc., 1 per cent. by vol., sulphuric acid.*

Cc. required.	Dilution.	Equivalent.
3.11*	1 in 500	.01286
3.87	1 in 450	.0132*
3.68	1 in 400	.0136
4.13	1 in 350	.0138*
4.76	1 in 300	.0140
5.67	1 in 250	.0141*
7.04	1 in 200	.0142

The fluid measures 30 cc. and contains 3 cc., 1 percent. by vol., sulphuric acid.

Cc. required.	Dilution.	Equivalent.
4.31	1 in 600	.0116
4.67	1 in 500	.01286
5.06	1 in 450	.0132*
5.51	1 in 400	.0136
6.21	1 in 350	.0138*
7.15	1 in 300	.0140
8.50	1 in 250	.0141*
10.56	1 in 200	.0142

Fluid measures 25 cc. and contains 2½ cc., 1 per cent. by volume, sulphuric acid.

Cc. required.	Dilution.	Equivalent.
3.89	1 in 500	.01286
4.21	1 in 450	.0132*
4.59	1 in 400	.0136
5.17	1 in 350	.0138*
5.95	1 in 300	.0140
7.09	1 in 250	.0141*
8.80	1 in 200	.0142

* In the case of this as in all other alkaloids mentioned in this paper, the equivalents marked with an asterisk are interpolations, all others were experimentally determined.

¹ I originally recommended 30 cc. as the dilution best suited for this table, intending thus to include those drugs containing as much as 1.2 to 1.3 per cent. of alkaloid, but as these are rather the exception than the rule the smaller volume as pointed out by the Editor of the *Pharm. Era* is to be preferred. The 30 cc. table, likewise a 25 cc. table, is however here given, as they may sometimes be of use.

² The volumes given at the head of the tables refer to the volume which the fluid should have at the beginning of the titration.

³ In practice reading is of course only to tenths of cc. but in the tables readings have been calculated to hundredths for sake of mathematical exactness; they may always be read to the nearest tenth.

BERBERINE

Gives very favorable results on titrations with Mayer's reagent. My own results for titrations in dilutions for 1 in 200, 1 in 400 and 1 in 600 showed an equivalent somewhat smaller than that found by Lyons; but on the whole I prefer to accept the results of his work,¹ and the following table is constructed on his equivalents:

Fluid measures, 40 cc.² at the beginning of the titration, and contains 6 cc. of 1 per cent. by vol., sulphuric acid.

Cc. required.	Dilution.	Equivalent.
3.06	1 in 600	0.0218
3.36	1 in 500	0.0238*
3.57	1 in 450	0.0249*
3.89	1 in 400	0.0257
4.43	1 in 350	0.0258*
5.13	1 in 300	0.0260*
6.11	1 in 250	0.0262*
7.6	1 in 200	0.0263

BRUCINE.

Titration of this alkaloid are far from satisfactory. Results are apt to vary widely, and on comparatively little provocation. When a series of equivalents were obtained which agreed among themselves the following were the figures:

1 in 200.....	0.01059
1 in 300.....	0.01025
1 in 400.....	0.01016

It will be seen that these figures differ quite materially from those of previous experimenters, and it is scarcely worth the trouble to calcu-

¹ For 1 in 200, 1 in 400, and 1 in 600, I found 1 cc. of the reagent to precipitate, respectively, 0.0257, 0.0218 and 0.0186 of alkaloid. I believed at the time that my alkaloid was not quite pure, and in this case the presence of small amounts of hydrastine would lower the equivalent considerably, as 1 cc. of the reagent will precipitate of this alkaloid only 0.0101. With an alkaloid giving as good results as berberine is reported and seems to give, it is likely that the highest equivalent obtained would be the most nearly correct.

² In applying Mayer's agent to hydrastis probably a dilution of 20 cc., representing 2½ grammes of drug, would be better than 40 cc.; but in this case titration give at best only a rough idea of the value of the drug, and can hardly be regarded as having comparative value, owing to the wide difference between the titration equivalents of hydrastine and berberine. Here we must be content to state results as "so many" cc. of reagent to each gramme of drug, or cc. of fluid extract.

late a table for the correction of the results of titration, as probably the alkaloid will never be estimated by this means.

Strychnine and brucine in mixture with the two alkaloids in mixtures varying from 60 per cent. to 35 per cent. of strychnine, and in solutions containing 1 part in 200 of the mixed alkaloid, the average equivalent of four experiments was found to be .0095. For rough comparisons of samples of *nux vomica* this equivalent might be used, but ordinarily it is best to estimate the alkaloids by their weight.

EMETINE.

The equivalents of this alkaloid in different degrees of dilution were presented before this association at its last meeting.¹ Detailed comment is unnecessary here as it was given last year by myself, and has been considered thoroughly by others in different places. The tables to follow were the same as those which I have already given, but are now offered in greater detail.

Observation shows that with the presence of only small amounts of free acid 1 cc. of the reagent in different degrees of dilution precipitates as follows:

1 in 200.....	.0109
1 in 300.....	.0105
1 in 400.....	.0102
1 in 500.....	.0100
1 in 600.....	.0095

The precipitate from 0.100 of alkaloid weighs on an average 0.245 grammes, corresponding to 40.81 per cent. alkaloid.

Fluid measures 30 cc.² at the beginning of the titration, and contains 3cc. of 1 per cent. by vol. sulphuric acid.

Cc. Reagent Required.	Dilution.	Equivalent.
6.00	1 in 500	.0100
6.60	1 in 450	.0101*
7.85	1 in 400	.0102
8.32	1 in 350	.0103*
9.52	1 in 300	.0105
11.21	1 in 250	.0107*
13.76	1 in 200	.0109

¹ Proc. M. S. P. A., 1887, p. 98, et seq.; also in *Pharm. Era* i. 400. et seq.

² This dilution is suited to 2½ grammes of drug, or 5 cc. of fluid extract (or about ¾ grammes of solid extract).

These equivalents are not very different from those given by Dr. Lyons, and it is not a matter of very great consequence which are used.

GELSEMINE.

My own experience though limited confirms previous unfavorable reports on estimations of this alkaloid by means of Mayer's reagent. The end reaction is far from being distinct or satisfactory. I have only made one series of titrations on known material and though results agreed among themselves fairly well they differ from previous published statements. This is not to be surprised at, for in addition to general unsatisfactory results it may also be said that the commercial alkaloid is most likely a very variable product. However I have allowed my results to stand as they were obtained. It has been pointed out that phosphomolybdic acid will most likely supersede in the estimations of this alkaloid.¹ A table however is given for corrections, etc., based on the observation that in slightly acid solutions 1 cc. of the reagent precipitates—

1 in 200.....	0.0109
1 in 400.....	0.0090
1 in 600.....	0.0078

The precipitates when collected, immediately washed, dried and weighed, average about 0.205 grammes of alkaloid equal to approximately 49 per cent. alkaloid.

Fluid measures 15 cc.²

Cc. Required.	Dilution.	Equivalent.
3.20	1 in 600	.0078*
3.57	1 in 500	.0084
4.17	1 in 400	.0090*
4.55	1 in 350	.0094
5.10	1 in 300	.0098
5.77	1 in 250	.0104
6.88	1 in 200	.0109*

HYDRASTINE.

The end reaction with this alkaloid is not very distinct but by using care in noting its end, as already indicated, duplicate titrations may

¹ Paper read by the writer before the AMERICAN PHAR. ASSOC., Sept., 1888.

² Probably best suited as a representative of 25 cc. of fluid extract or an equivalent of drug.

be made to agree quite closely. The titrations were all made in a solution containing one-tenth per cent. by volume of sulphuric acid and four determinations made for one part in 200 but only two for one part in 500 which agreeing closely gave averages respectively of 0.0101 and 0.0076.

These equivalents are considerably lower than those offered by Lyons, which may perhaps be accounted for by the difference of acidity in the solutions titrated. In the case of my own I can specify the exact amount of acid used, and in titrations where this can be accurately controlled the equivalents I think can be relied on.

If this acidity is not under control I should be inclined to doubt the results of titrations. The mere fact that two observers working independently with an alkaloid like hydrastine should obtain such widely discrepant results shows that slight variations in the conditions will affect the results. The acidity seems to be the point on which we must have differed. As already stated, my titrations were made in solutions containing one per cent. sulphuric acid. The four determinations made for one in 200 showed respectively, .0100, .0100, .0101 and .0102 while for one in 500 the titration resulted in .0077 and .0075.

The precipitates from 0.100 grammes of alkaloid when collected immediately dried and weighed averaged 0.206 grammes, corresponding to 48½ per cent. alkaloid.

Ordinarily it cannot be said to be safe to determine two equivalents so widely separated as these dilutions were, and then interpolate intermediate equivalents for reasons which will be readily understood by noting the equivalents for aconitine or berberine. In the case of hydrastine however it seems permissible and consequently it has been followed in the table.

Fluid measures 20 cc., and contains 2 cc., of 1 per cent. by volume sulphuric acid.

Cc. required.	Dilution.	Equivalent.
5.26	1 in 500	.0076*
5.81	1 in 400	.0088
6.85	1 in 350	.0090
7.09	1 in 300	.0094
8.16	1 in 250	.0098
9.90	1 in 200	.0101*

SANGUINARINE.

Dragendorff on the results of some experiments of Masing hazards a guess that the titration equivalent of sanguinarine will be found to be .00743. Calculation shows that this is a theoretical equivalent based on Flückiger's formula for the alkaloid ($C_{17}H_{15}NO_4=297$, $\frac{1}{10}$ of $297=.00743$), and assuming $C_{17}H_{15}NO_4.HI.HgI_2$ to be the composition of the precipitate. My own results are widely at variance with this figure. A number of titrations have been performed, of which the following are averages:

1 in 200.....	.0183
1 in 300.....	.0178
1 in 400.....	.0173
1 in 500.....	.0165
1 in 600.....	.0155

Duplicates show some differences even when the conditions seem the same. The end reaction, however, is sharp and well defined, and approaches closely to berberine and strychnine in this respect. Like these alkaloids, also, the excess of reagent required to precipitate the alkaloid is small, at least in the stronger solutions, and, on the whole, the alkaloid may be ranked with those giving good results in titrations. Just what the action of its associated alkaloid chelidonine is I cannot say, though it would be very interesting to know. 0.100 grammes of alkaloid yield a precipitate weighing from 0.180 to 0.206, with an average of 0.194, corresponding to 51.5 per cent. average of alkaloid in the precipitate.

Fluid measures, 30 cc. at the beginning of the titration, and contains 3 cc. of 1 per cent. by vol. sulphuric acid.

Cc. reagent.	Dilution.	Equivalent.
3.64	1 in 500	.0165*
3.94	1 in 450	.0169
4.84	1 in 400	.0173*
4.89	1 in 350	.0176
5.62	1 in 300	.0178*
6.63	1 in 250	.0181
8.19	1 in 200	.0183*

STRYCHNINE.

My own experiments agree substantially with those of previous observers. For dilutions running from 1 in 200 to 1 in 400 but little

variation is noticeable, and even up to 1 in 600 no correction seems called for. In a dilution between 1 in 200 and 1 in 400 the equivalent may be regarded as being .0088 to .0090. The average weight of precipitate is 0.265 from 0.100 of alkaloid, equal to 37.7 per cent. alkaloid in the precipitate.

Strychnine and Brucine in mixture. See Brucine.

CATECHU AND GAMBIER.¹

By HENRY TRIMBLE.

QUERY No. 27.—“The U. S. P. denotes as catechu the extract of *Acacia Catechu*; the Br. P. uses the extract of *Uncaria Gambier*. Which of these two is to be preferred?”

The extract of *Acacia Catechu* is known in commerce as *cutch*, and that from *Uncaria Gambier* as *gambier*; the former of these terms, therefore, will be used to indicate that officinal in the U. S. P., and the latter that of the Br. P. *Catechu* is a term applicable to either or both.

Considerable difficulty was experienced in finding gambier among the wholesale druggists, and such synonyms as “pale cutch” and “terra japonica” were tried, but either ordinary cutch was sent, or I was told they did not keep it.

It must be borne in mind that cutch is not imported primarily for use in medicine, but is brought in by hundreds of tons for the use of dyers. Gambier comes in cubes or masses of indistinct cubes, in equal if not larger amounts than cutch, for the use of both dyers and tanners. Their prices are about the same, ranging from five to eight cents per pound. All authorities agree that the medicinal use of these two remedies is for their astringent and very slight tonic properties; therefore, preference should be given to the one which possesses the greatest astringency.

A chemical examination of representative samples as found in our market, was apparently the only method of solving the problem, therefore the results of the examination of three samples

¹Read before the American Pharmaceutical Association at Detroit, and communicated by the author.

of each will be given as a basis, although a number of others were partly examined in studying adulterations and searching for catechin.

No. 1. Cutch "S. M." brand, in good repute in U. S.

No. 2. Cutch, "M. M." brand, in good repute in England, and given me by a Bradford dyer.

No. 3. Cutch, brand not known, purchased of a wholesale drug firm in Philadelphia.

No. 4. Gambier, in masses, from a wholesale drug firm of Philadelphia.

No. 5. Gambier, in cubes, dark, direct from importer.

No. 6. Gambier, in cubes, light, direct from importer.

One gram of each was powdered and extracted in a Tollens apparatus, successively with boiling stronger ether and boiling absolute alcohol. The residue was percolated with cold distilled water as long as anything dissolved. The following is a summary of results in per cent.

Sample No.....	1.	2.	3.	4.	5.	6.
Soluble in stronger Ether....	33.30	33.65	25.60	45.59	36.45	40.20
Soluble in Absolute Alcohol.	22.08	22.63	31.78	26.80	32.28	28.25
Total by Ether and Alcohol.	55.38	56.28	57.38	72.39	68.73	68.45
Soluble in Water.....	27.40	29.01	20.50	10.13	15.20	16.05
Total Solubility	82.78	85.29	77.88	82.52	83.93	84.50

It is usually stated in the books that the important constituents of these two drugs are catechin, soluble in ether, and catechu-tannic acid, soluble in water and alcohol, but insoluble in ether. If this be true, we would have a very ready method of determining the value of a sample; for, by simply adding those portions soluble in ether and alcohol, we would have the total available portion. That soluble in water after the above treatment, and so given in the chart, is mucilage with a part of the inorganic constituents, and forms no part of the most important pharmaceutical preparation—the tincture.

The sum by the first two solvents very closely indicates that which would be dissolved in making the tincture, but as will be shown it does not indicate the astringent value of the samples. A more accurate method for estimating the catechin, is to extract it by agitating the

aqueous solution with ether. By this process the following percentages were obtained:

Sample No. 1.	2.80.	Sample No. 4.	12.64.
Sample No. 2.	1.70.	Sample No. 5.	7.76.
Sample No. 3.	10.70.	Sample No. 6.	19.76.

The aqueous residue from the agitation was warmed to expel ether, and treated in some cases with gelatin and alum, in others with gelatin and ammonium chloride, to separate tannin. The results in all cases were low and unreliable.

Portions of the original samples were then treated with "hide powder," according to the method of Simand and Weiss (*Dingler's Polyt. Jour.*, 260, 564), and the results for tannin gotten, which, while not entirely satisfactory, are undoubtedly the best to be obtained with our present knowledge. The following are the percentages of tannin:

No. 1.	31.94.	No. 4.	33.34.
No. 2.	33.54.	No. 5.	47.18.
No. 3.	25.50.	No. 6.	45.90.

By adding to these figures the amount of catechin, we get the total available value, and by then adding the mucilage, ash and moisture, and subtracting from 100, we find the per cent. of inert constituents.

Samples No.....	Cutch.			Gambier.		
	1.	2.	3.	4.	5.	6.
Catechin.....	2.80	1.70	10.70	12.64	7.76	19.76
Catechu-tannic Acid.....	31.94	33.54	25.50	33.34	47.18	45.90
Total Valuable Constituents..	34.74	35.24	36.20	45.98	54.94	65.66
Mucilage.....	27.40	29.01	20.50	10.13	15.20	16.05
Ash.....	2.29	2.27	2.10	4.74	3.37	3.50
Moisture.....	12.50	12.20	15.36	10.33	11.03	9.90
Coloring and other Inert Matter.....	23.07	21.28	25.84	28.82	15.46	4.89
	100.00	100.00	100.00	100.00	100.00	100.00

Dr. A. Lehmann (Dissertation, Dorpat, 1880), examined a large number of samples of cutch and gambier, and found the catechin to vary from 13.8 to 33.8 per cent., and the catechu-tannic acid from 22.6 to 50.8 per cent. He was evidently able to procure better samples than the average that come to this country, although the results

given in the above chart indicate the absence of intentional adulteration.

It has long been a statement in the text books that cutch and gambier are identical in chemical composition. It has, however, never been proven, and I am convinced that it is entirely erroneous. In the above samples no crystallized catechin could be obtained from samples 1 and 2, and only a small quantity from 3, while it readily crystallized from the aqueous solution of the ethereal extract of gambier. Both the physical appearance and the analysis indicate that there are important differences in the coloring matter of the two. This is further emphasized when we consider their respective commercial uses. The tanner selects gambier for his purpose because he wishes tanning material without color; the dyer prefers cutch, because he wants coloring matter as well as tannin, the color in some cases being the more important of the two. From the published accounts of the methods of preparing these two drugs, it is impossible to believe they could be chemically identical.

Apart from their different botanical origin, the long continued heating necessary to extract cutch from the hard heart wood, is so different from that required to exhaust the more porous twigs and leaves of the gambier, that the evaporation in the case of the cutch is carried directly to dryness, the decomposition products being such as to prevent the "setting" of the mass as it does in the case of the gambier.

In the latter the concentration of the liquor is stopped when it reaches the consistency of syrup, and the liquid by stirring and cooling "sets" on account of separation of catechin, becoming of such solidity that it can be cut into blocks, and further dried at such a low temperature that comparatively little change takes place. When gambier comes in cubes it precludes a kind of adulteration which is extensively carried on with cutch, namely the admixture of small stones, pieces of earthenware and bricks.

Such adulteration is liable to be overlooked in selecting samples for analysis, and is best indicated when a large lot is powdered and portions of this analyzed.

Two samples of powdered cutch were examined and yielded 14.01 and 18.20 per cent. of ash, which was made up of sand and crushed stones. These samples had been further reduced in value by the heat necessary to dry them previous to powdering, as is indicated by the

following percentage results obtained by treatment with ether and alcohol :

Samples No.	7.	8.
Soluble in ether	0.90	8.75
Soluble in absolute alcohol.....	9.93	17.50
Total valuable constituents.....	10.83	26.25
Mucilage, etc.....	47.30	29.10
Ash.....	14.01	18.20
Moisture.....	14.10	7.30
Insoluble.....	13.76	19.15
	100.00	100.00

Gambier in cubes could not be so adulterated, and it is so dry as to be readily powdered in a mortar without previous heating to expel moisture. It is stated that gambier is adulterated by the addition of clay, but this admixture is probably not more common than it is with cutch; in both it may be detected by the amount of residue left on burning.

Another important point is to be observed in regard to cutch; there are on the market for the use of dyers, several preparations under the name of "patent cutch," "purified cutch," etc., made by dissolving the commercial article in warm water, evaporating this aqueous solution, and adding some mordant, often potassium bichromate, to develop the color for the dyer.

These preparations are liable to creep into the drug market, and if used in medicine do much harm. Such accidents would be impossible if cube gambier alone were used. British writers are singularly reticent about their reasons for preferring gambier, but it is probably in view of facts similar to those above given. The Edinburgh Pharmacopœia, about 1840, was the first to give the option of using the extract of *Uncaria Gambier*, as well as that of *Acacia Catechu*. When in 1864, the three British Pharmacopœias were incorporated under one name, both were retained under the distinct titles of "*Catechu Pallidum*," and "*Catechu Nigrum*," but in 1874 the latter was abandoned. The only English criticism I have been able to find on this change is by Mr. Peter Squire (Companion to British Pharmacopœia, 10th edition, page 85), who states that the black is the one adopted by other Pharmacopœias, and is preferred in the arts and manufactures. It is well known "to be by far superior to the pale in

astringency, and always to be had of good quality; it is therefore a matter of surprise and regret that it has been rejected from the British Pharmacopœia."

Notwithstanding this adverse opinion, which appears to be only an opinion, if the committee on revision of the U. S. P. will make the change to gambier in cubes, and include in addition to the requirements of the Br. P., that it shall not yield over 5 per cent. of ash, I believe it would be preferable for the following reasons :

1. Gambier has more available astringency.
2. If in cubes it cannot be so easily adulterated.
3. Being more carefully dried it is more easily powdered than cutch, and without the further application of heat.
4. The cubes are more uniform in composition, and are not liable to contain mordants added for the use of dyers.

NOTE ON STAR ANISE.

By E. M. HOLMES, F. L. S., Curator of the Museum of the Pharmaceutical Society of Great Britain.

The recent publication of a description and figure of the true star anise plant in the *Botanical Magazine*, by Sir Joseph Hooker, affords an opportunity of adding to the notes on this subject which appeared in a previous volume of the *Pharmaceutical Journal* ([3], vol. xi. page 489. See also AM. JOUR. PHAR. 1881, pages 335 and 412).

In December, 1880, notwithstanding the publication of *I. anisatum* as the botanical source of star anise in Bentley and Trimen's "Medicinal Plants," Dr. Bretschneider, then medical officer to the Russian Embassy at Peking, in "Notes on some Botanical Questions connected with the Export Trade of China," states "the plant which produces this article is still unknown to botanists," and he then goes on to remark, "The first authentic information concerning the actual habitat of the star anise tree was furnished by Mr. Piry, in his 'Report on the Trade in the Port of Pakhoo' for the years 1878-1879, in which star anise is said to be brought for exportation to Kin-chow and Pakhoi from the province of Kuangsi, two districts in that province producing the article, Lung-chow on the borders of Annam and the country about Po-se on the West River, close to Yunnan."

Dr. Bretschneider adds a translation from the well-known work on

Chinese materia medica and natural history "Pen t'sao kang mu," vol. xxvi., fol. 62, in which it is stated that star anise grows in the mountains near the Tso-kiang and Yu-kiang (rivers), and that the kind most valued in China grows in Kuangsi and Kuangtung and in Annam. Dr. Bretschneider remarked that both the above rivers are in Western Kuangsi, the first being a tributary of the West River. The city of Po-se mentioned by Mr. Piry is situated on it. The Tso-kiang is a southern tributary of the Yu-kiang. These notes appear to have attracted the attention of the late Dr. Hance, who in October, 1881, forwarded seeds of the true plant received from Pakhoi to Kew.

In the same year fruit and fragments of the leaves were forwarded by Mr. C. Ford from the Hong Kong Botanical Gardens to Kew.¹ A few seedlings of the plant obtained by Mr. Kopsch, Commissioner of the Chinese Imperial Maritime Customs at Pakhoi, were grown in the Hong Kong Gardens and flowered in November, 1886, when the plants had attained a height of nine feet. Some seedlings sent by Mr. Ford to Kew in 1883 flowered at Kew in 1887, and from these the excellent plate given in the *Botanical Magazine* was drawn.

Sir Joseph Hooker points out that the plant must be placed in quite a different section of the genus from that to which *I. anisatum*, L., belongs, since it has broad obtuse perianth segments, and the peduncles are not bracteate at the base. He describes it as a new and hitherto undescribed species, as follows:—

"*Illicium verum*, Hook. f. (*Bot. Mag.*, t. 7005, July, 1888.)—*Illicium verum*: foliis elliptico-lanceolatis v. oblanceolatis obtusis v. obtuse acuminatis in petiolum brevem angustatis floribus axillaribus breviter pedunculatis globosis, perianthii foliolis ad 10 orbiculatis concavis coriaceis exterioribus majoribus ciliolatis intimis rubris staminibus ad 10 brevibus, filamentis cum connectivo, in corpus carnosum subvoidem confluentibus, loculis adnatis parallelis subremotis oblongis, carpellis ad 8 stigmatibus brevibus vix recurvis carpellis maturis ad 8 cymbiformibus longiuscule rostratis.

"*I. anisatum*, 'Gært. Carp.,' vol. i., page 338, t. 69 (Non Linn)."

The leading features in the plant appear to be the solitary axillary globular flowers, which do not expand fully, the segments remaining convex, the inner segments being red, and the ten stamens, in which the filament forms with the connective an ovoid body. The peduncles

¹ *Bot. Magazine*, t. 7005.

are curved and barely half an inch in length. It may be here remarked that a very similar plant, but with smaller and yellowish flowers, has been grown at the Botanical Gardens at Regents Park for the last eighteen years under the name of *I. anisatum*, but the leaves of this species have a sassafras taste. They differ from those of *I. religiosum* in having the midrib prominent below and depressed on the upper surface of the leaf, while in *I. religiosum* the midrib is prominent on the upper and not on the lower surface, and the taste is astringent and terebinthinous.—*Phar. Jour. and Trans.*, August 11, page 101.

SHELLAC.¹

BY R. BENEDIKT AND E. EHRLICH.

When shellac, previously freed from fat by boiling with sodium carbonate, is boiled with caustic alkalis for two hours, and the cold solution acidified with sulphuric acid, about 70 per cent. of a viscous, liquid shellac is precipitated. The product is extracted with ether, and purified by means of the magnesium salt ($C_{46}H_{70}Mg_2O_{13}$). It is a thick, viscous liquid, which becomes mobile when heated, and is only very sparingly soluble in boiling water, but dissolves readily in alcohol and ether. The alcoholic solution is precipitated by water. When heated, water is evolved and on cooling a solid mass very similar to ordinary shellac is obtained. The acid value of liquid shellac is nearly three times as great as that of ordinary shellac, 1 gram requiring 0.204 gram of potash for complete saturation. From this datum and from the elementary analysis, the formula of liquid shellac is probably $C_{46}H_{72}O_{12}$. A mixture of ordinary and liquid shellac is obtained by boiling two portions of shellac, one with sodium carbonate, the other with soda, separating the wax and acidifying the cold mixed solutions with acetic acid. It is a plastic resin which when free from acid retains its plastic condition for a considerable time, but after several months gradually begins to harden at the surface. The alkaline-earth salts of liquid shellac are soluble in cold water in all proportions, they are precipitated as thick liquids when the solution is boiled, but redissolve completely on cooling. When an aqueous solution is evaporated over sulphuric acid, a completely transparent residue is obtained, which after some time becomes opaque. These salts are very brittle,

¹ *Monatsh.*, ix., 157—164; *Jour. Chem. Soc.*, 1888, 846.

and even in the dry state are very readily soluble in cold water. The *barium* salt is obtained by neutralizing an alcoholic solution with baryta-water. A solution of the magnesium salt gives with lead, silver, and zinc salts white precipitates which form resinous masses when warmed.

Shellac freed from wax yields 20 per cent. of azelaic acid when boiled with potash and potassium permanganate, products smelling like butyric acid being also formed. Shellac is completely converted into azelaic acid and fatty acids by potassium permanganate, when the residual resin is again boiled with the permanganate, and the process repeated until the whole is oxidized.

MODE OF FORMATION OF GUMS AND GUM-RESINS.

Although these two classes of substances differ, as a general rule, in their mode of formation—the former being the result of chemical changes in the cell-wall, the latter a secretion in the interior of cells—this is not altogether without exception. In some species of *Orchis* true gum or mucilage is secreted in the interior of cells. Intercellular passages or canals are known as “schizogenous,” when they result from the simple separation or parting of cells, “lysigenous” when they are formed by the absorption or disappearance of cells or cell-walls. Essential oils and gum-resins are generally formed in a layer of so-called “epithelial” cells lining the cavity or receptacle, which may be either of schizogenous or lysigenous origin, and into which they are diffused through the very thin cell-walls of the epithelial cells. There are, on the other hand, instances in which the cell-wall takes part in the formation of essential oils and resins, as in the lysigenous oil-passages of the *Aurantiaceæ*.

In a recent paper in the *Berichte* of the German Botanical Society, Herr A. Tschirch describes the mode of formation of a number of essential oils and gum-resins. *Copaiva* balsam, derived from *Copaifera Langsdorffii* and *officinalis*, is not formed, as is sometimes stated, in schizogenous, but in lysigenous canals. The absorption of the cell-walls and the formation of the resin commences in the parenchyma of the wood, advancing from there to the medullary rays, the libriform and the vessels. The resin-passages in species of *Dipterocarpus*, which yield gurjun balsam, and those in *Eperna falcata*, which yield *Balsamum antharthriticum*, are formed in the same way. In *Styrax*

Benzoin also, the source of the benzoin of commerce, the resin is not formed in schizogenous, but in lysigenous canals. The formation originates in the medullary rays, advancing from there to the surrounding phloëm-parenchyma, and finally to the bast-cells and sclereïdes.

The same is, in general terms, the history of the formation of the resin in *Abies* and *Thuja*. But in the various kinds of myrrh, derived from species of *Balsamodendron* and *Boswellia*, the gum-resin is always formed in schizogenous receptacles or in true cells. In *Laurus Camphora* also, in the formation of camphor oil, actual absorption of the cell-walls could not be detected. In young branches it is contained in thin-walled cells situated in the wood near to the medullary rays. The large fissures in old wood filled with camphor are probably of lysigenous origin, like those of the wood of *Andira*, which contain "araroba," and those which contain catechu in *Acacia Catechu*.—*Phar. Jour. and Trans.*, August 11, page 108.

THE FURFURALDEHYDE COLOR REACTION.

By L. V. UDRANSZKY.

Mylius (1887) has shown that the red color produced by heating the bile acids, sugar, and sulphuric acid together, is due to the formation of furfuraldehyde from the two last-named reagents. He also showed that although of the substances he examined, the bile acids gave the test in the most marked manner, yet that there exist numerous organic substances that also give a similar reaction.

The present research is chiefly an expansion of Mylius' work. A very large number of organic substances were examined in the following way. A minute particle of the substance under investigation, or a drop of the substance if liquid, was placed in a test-tube with 1 cc. of water or alcohol, and then a drop of solution of furfuraldehyde; concentrated sulphuric acid was added carefully, and the result watched. The temperature of the mixture was not allowed to rise over 50°. As solutions of furfuraldehyde of a strength greater than 2.2 per cent. themselves give a coloration with sulphuric acid (showing an absorption-band spectroscopically at D), a solution of the strength 0.5 per cent. was used in all cases, which is a strength considerably greater than Mylius found necessary in the case of the bile acids.

¹ *Zeit. physiol. Chem.*, xii., 355—376 and 377—395. Reprinted from *Jour. Chem. Soc.*, Aug., 1888.

Some of the substances examined gave a coloration with sulphuric acid alone; the tint given with furfuraldehyde also varied a great deal; the particulars in each case are stated in a lengthy table. The reaction was found not to be a class reaction. The substances which give a color are as follows:—Acetal, acetaldehyde, ethyl acetoacetate, acetone, ethylene glycol, malic acid, alizarin, amyl nitrite, anilidoacetic acid, aniline, anisaldehyde, anthracene, anthraquinone, apomorphine, atropine, benzaldehyde, borneol, catechol, brucine, quinic acid, cholesterolin, cinchonine, codeine, coniferin, conine, cumarin, cyanuric acid, cymene, digitalin, dimethylaniline, dihydroxytartaric acid, diphenylamine, gallic acid, Japan camphor, cresol, lævulinic acid, mesitylene, mesityl oxide, metaldehyde, methyl alcohol, methylhydantoin, methylaniline, morphine, naphthalene, *a*-naphthol, *a*-naphthascato, cenantaldehyde, orcinol, paraldehyde, paraffin, phenanthrene, phenanthraquinone, phenol, phenylhydrazine, phloroglucinol, phorone, propaldehyde, protocatechuic acid, pyrogallol, resorcinol, salicaldehyde, salicylic acid, scatol, stearic acid, strychnine, toluene, thymol, tyrosine, valeraldehyde, vanillin, vanillic acid, vaselin, veratrine, metaxylene, paraxylene, cinnamaldehyde.

The substances which gave no color are as follows:—Acetamide, acetanilide, acetophenone, alloxan, alloxantin, aspartic acid, benzonitril, benzoic acid, succinic acid, hydrocyanic acid, pyruvic acid, butyric acid, caffeine, caproic acid, quinine, chinoline, quinone, quinoxaline, chloral hydrate, chloroform, citric acid, crotonic acid, cyanamide, dextrin, metadinitrophenol, dinitrotoluidine, dulcitol, acetic anhydride, formamide, fumaric acid, fermentation lactic acid, glycerol, glycocine, glycollic acid, glyoxal hydrogen sulphite, uric acid, urea, hippuric acid, isatin, leucine, malic acid, maltose, mandelic acid, mannitol, methylamine, orthonaphthoxyindol, metanitrilaniline, ortho-nitrobenzaldehyde, orthonitrobenzoic acid, orthonitrophenol, ortho-nitrophenylpropionic acid, oxalic acid, ethyl oxalate, parabanic acid, metaphenylenediamine, phenylacetic acid, picrotoxin, picric acid, piperidine, pyridine, quinol, mucic acid, starch, tannin, tetroxyethylbenzidine, grape-sugar, tartaric acid, trimethylamine, urethane, xyline, cinnamic acid.

The spectroscopic appearances of the colors obtained differ in many cases; in all probability the products are therefore different; particulars in the case of a few of the more important substances are given; in the case of bile there is a band between D and E, and another at

F. Several of the substances examined, for instance *a*-naphthol, give the test with greater delicacy than is the case with cholic acid.

The fact that the test is given by coniferin gave rise to a number of experiments on the color reactions produced by strips of the wood of the pine and other trees.

In conclusion, the delicacy of the reaction as applied to the detection of bile is discussed; using a 1 per cent. solution of furfuraldehyde in the manner already detailed, it is found possible to obtain a color with 0.000033 gram of cholic acid; a quantity of 0.00005 gram gives a color sufficiently intense to show its spectroscopic bands; in order to obtain evidence of the presence of bile acids in urine, it is generally necessary first to isolate them from that secretion. Normal urine does not contain bile acids.

The question whether normal urine contains carbohydrates has been one on which a large amount of work has been done, but has never been satisfactorily settled. The most recent of these observations are those of Landwehr (1886), who states that animal gum may be present in the urine, and the author's own researches on humous substances (1887). The fact that carbohydrates yield furfuraldehyde on treatment with acid, which can be identified by means of the characteristic color given with bile acid, *a*-naphthol, and many other substances, has led to the present reinvestigation of the question. The special method adopted is that of H. Schiff (*Ber.*, xx., 540), in which strips of filter-paper are dipped in a mixture of xylydine, glacial acetic acid, and alcohol, then dried. The substance suspected to contain carbohydrate is heated in a tube with sulphuric acid; the fumes, which contain furfuraldehyde, strike a red color with the strips of paper placed at the mouth of the tube. Using this method with quite small quantities (a few drops) of normal urine, the color never fails to appear. The conclusion is drawn that normal urine contains carbohydrates, although of what kind is doubtful. A reaction described by Molisch (*AMER. JOUR. PHARM.*, 1887, p. 74), in which either thymol or *a*-naphthol and sulphuric acid give a red coloration, may also be used with the same result.

In cases of glycosuria these reactions occur more readily, and by a minutely described process of appropriate dilution of the urine, an approximate quantitative result may be obtained, at least sufficiently near to enable one to say whether the secretion contains more than a normal amount of carbohydrate.

In all such testing, the urine must be free from proteid, as the concluding portions of the paper show that furfuraldehyde is one decomposition product of proteid; this fact is considered to be the first well-established chemical relationship between proteids and carbohydrates, although the physiological connection between the two classes of substances has long been recognized (Bernard, Seegen, &c.). It also affords an explanation of the color reactions which are caused by treating proteid with acid, such, for example, as the Adamkiewicz reaction. The amido-acids which result from the decomposition of proteids yield no furfuraldehyde.

DETECTION OF IMPURITIES IN COMMERCIAL ALCOHOLS.¹

By L. GODEFROY.

6 or 7 cc. of the alcohol is agitated with one drop of perfectly pure benzene, mixed with 6 or 7 cc. of pure sulphuric acid of 66°, and again agitated. If reducing "head" products are present, the liquid immediately acquires a coloration which gradually darkens for a few minutes, and varies from pale brownish-yellow to black. Pure ethyl alcohol gives no immediate coloration, but after 8 or 10 minutes the liquid acquires a slight rose tint. This test will detect 1 cc. of "head" products in 1000 litres of alcohol, or 1 part per 1,000,000. The quantity may be estimated by comparing the color with that given by alcohol containing a known quantity of acetaldehyde, and expressing the results in terms of the latter.

If the liquid remains colorless after several minutes, no "head" products are present. In order to detect "tail" products, care is taken that the acid and alcohol are thoroughly mixed, in order to avoid polymerisation, and the liquid is boiled for a short time and then allowed to remain for several minutes. Under these conditions, pure ethyl alcohol gives an ochre-yellow coloration; but in presence of "tail" products the liquid acquires a brown color with a green fluorescence, the depth of tint increasing with the quantity of impurity. This test is not so sensitive as the first, but will detect 1 part in 100,000.

Neither of these tests is directly applicable to wines, spirits, etc. These liquids should be distilled, and the first fraction tested for "head" products, and the last fraction for "tail" products.

¹ *Compt. rend. civi.*, 1018—1020; *Jour. Chem. Soc.*, 1888, p. 875.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the American Journal of Pharmacy.

CRESYLIC ACID OR CRESYLOL.—According to recent studies by Dr. Henri Delplanque (*Bull. gén. de thérap.*, Aug. 15, 1888), this substance is superior to phenol as an antiseptic, while it is 75 per cent. less toxic to animals. The author's experiments were made by means of cultures of the bacilli of the principal zymotic diseases.

STERILIZATION OF MEDICINAL SOLUTIONS.—M. Gaquemaire finds that when certain saline solutions are made in carbonic acid water with a pressure of 4 or 5 atmospheres, they will remain free, for a considerable time, from the cryptogamic vegetations which pharmacists find so undesirable. To the possible objection that the constant uncorking of the bottle in dispensing permits the gas to go off, the author says that the liquid will continue to retain one volume of the gas, and, as a matter of fact, an excess of it is always found in the last dose taken from the bottle.—*Bull. gén. de thérap.*, Aug. 15, 1888.

CAMPHORATED NAPHTHOL.—M. Desequelle (*Arch. de Pharm.*, Sept. 5, 1888), finds that a mixture of β naphthol, 10 gm., and camphor 20 gm., finely pulverized, has identical properties with camphorated phenol. The product is a colorless syrupy liquid, insoluble in water, and miscible in all proportions with fixed oils. Its antiseptic properties are superior to those of phenol, and—according to Prof. Bouchard's experiments—it is less toxic. Does it hold its antiseptic properties? If so, this mixture should, for surgical uses replace the phenol compound.

CONSTANTIN PAUL'S SACCHARIN LIQUOR is said to have been adopted by several of the Paris pharmacists. The formula is: Saccharin, 6 gm.; bicarb. soda, 4 gm.; alcohol at 40°, 100 gm.; ol. menth., 20 drops; a teaspoonful represents 25 cgm. of saccharin—sufficient to sweeten a tumbler of water. (See also *Elizir Saccharini*, page 516.

APPLICATION FOR PEDICULI PUBIS.—The following formula, originally published in the *Pratique méd.*, is recommended in the French journals, to replace mercury ointments for the above purpose: Petroleum, 15 gm.; balsam of Peru, 15 gm.; oil of laurel, 1 gm.

AN ARTIFICIAL GUM ARABIC, says the *Revue scientifique*, may be made by boiling 20 parts of sugar with 7 parts of fresh milk, adding

50 parts of a solution of 36 parts of silicate of soda in 100 parts of water, and heating to 50°C. (122° F.). The mass is then poured into tin receptacles and granulated masses resembling gum arabic, deposit by degrees. (See also August number, p. 406).

ALCOHOL MIXTURES ARE DANGEROUS to use in the middle ear in cases where suppuration is present. The cause of trouble is said to be (*Boll. d. mol. del orecchio*) the consequent dehydration of the healthy tissues of the neighboring parts.—*Monit. therap.*

ALKALOIDS OF COD LIVER OIL.—Gautier and Mourgues have separated a number of these, about one-half of which are fixed bases. They found butylamine, amylamine and hexylamine, together with three new bases, hydrolutidine, aselline and morhuine. They found also, a small quantity of lecithine and a crystallizable azotic acid which they call gaduinic acid. "It is at once," say the authors, "a quite powerful acid, and an alkaloid capable of giving crystallizable chloroplatinates."—*Union méd.*, July 21, 1888.

CHARDON MARIE, OR SEMEN CARDUI MARIE.—In a long study of visceral varices (*Bull. gén. de Thérap.*, June 15, 1888), Dr. A. Tripier claims to have had remarkable success with this drug in the treatment of abdominal varix, hemorrhoids, certain cases of urethral and uterine engorgement, and other forms dependent upon conditions of local congestion with painful tension. The treatment was adopted from indications given by Rademacher, followed by Worms, who used a decoction made from the seeds. Tripier uses a tincture (made from the seeds), in doses of 20 drops in a tumbler of water, night and morning.

TO RENDER SANTONIN VERY ACTIVE.—Santonin does not dissolve freely in ordinary alcohol, ether, or the fixed oils. Complete solution is obtained by treating as follows: Crystallized santonin, 1 gm.; strong alcohol, 120 gm.; ol. ricini, 240 gm. Dissolve the santonin in the alcohol, mix with the oil, and remove 80 gm. of the alcohol by distillation. The product is a very clear and active preparation, which Dr. Bayon (*Monit. therap.*, Aug. 6, 1888), claims to have long administered with the best results.

HYDROQUINONE is said to act best in moderate doses (30 to 50 cgm. for an adult), as it sometimes produces gastro-intestinal troubles, which obstruct its action. It acts rapidly in ileo-typhus, acute rheu-

matism and erysipelas, and is an antiseptic and an anti-ferment. It lowers both the pulse and the temperature, and acts upon the respiration and the arterial pressure; it also causes diuresis and diaphoresis. —*Med. ch. Rund.; Nouv. Rem.*, Aug. 8, 1888.

COMPOSITION FILLING FOR RUBBER GOODS.—The *Revue scientifique* says that laboratory articles of rubber may be repaired by filling the cracks or torn places with a preparation composed of 16 parts of sulphide of carbon; 2 of gutta percha; 4 of india rubber, and 1 of fish glue. Open places are filled by applying successive layers with a brush. Cut or broken places are filled up and the edges held together with a moderately tightened thread, which may be withdrawn in a day or two, when any projecting substance may be removed with a sharp knife.

LANESIN is a product analogous to lanolin, for which a patent has been obtained in Germany. The bleaching waters from wool are treated with lime, and the product with alkalis. The dried product is then treated with "appropriate solvents" which are evaporated, when the residuum is treated with the ethylic and methylic ethers of oleic or ricinic acid. A soft, smooth product is obtained which does not become rancid, and is "applicable to pharmaceutic and cosmetic uses."—*Arch. de ph.*, September 5, 1888.

OLEUM CINEREUM, OR "GRAY OIL," is recommended by Dr. Raugé (*Bull. méd.*, August 8, 1888), for hypodermic injections in syphilis. It is made of one part each of mercury and lanolin, to which 4 parts of olive oil is added.—See also *AMER. JOUR. PHAR.*, 1887, p. 294.

MERCURY IN THE URINE.—The urine is acidulated with hydrochloric acid, heated to 60° C. [140 F.], and allowed to cool, when it is again heated. A metallic strip composed of zinc and copper is plunged into the liquid at intervals, and upon this the mercury is deposited. After cooling and washing, the strip is exposed to the vapor of iodine which forms, with the deposit, iodide and biniodide of mercury.—*Jour. pharmacol.*, Brussels; *Arch. de phar.*, September 5, 1888.

BINIODIDE OF MERCURY PULVERIZATIONS FOR TUBERCULOSIS.—Miquel and Rueff's formula is given by the *Arch. de Phar.*, Sept. 5, 1888, as follows: Biniodide of mercury and iodide of potassium, of each 1 gm.; distilled water, 1000 gm. The solution is stable. At the

beginning, 10 ccm. is sprayed once daily, to be increased to 25 ccm. twice daily. The larger portion of the liquid should be inspired. It reaches the lungs, say the authors, but salivation does not follow, even after months of treatment. The sputa changes in character and diminishes in quantity; the number of microbes is lessened, but these organisms rarely disappear completely. The cough increases at first, and afterwards subsides.

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH.G.

Naphthol, lately used as a preservative for foods, can be detected by extraction with ether, allowing to evaporate and dissolving residue in hot water; the solution is first rendered faintly alkaline with ammonia, then faintly acid with nitric acid after which a drop of fuming nitric acid or of a nitrite solution is added, when a rose-red color indicates *naphthol*.—Beebe (*Ann. Chem. Rdsch.*, 1888, 623.

Citric acid has been found by T. Henkel (*Chem. Centralbl.*) to be present in cow's milk in quantity varying from 0.9 to 1.1 gm. per liter. The concretions frequently found in condensed milk consist of almost pure calcium citrate. Woman's milk contains no citric acid.—*Zschr. f. Nahrungsm. Unters.*, 1888, 135.

Piperine estimations.—50 gm. pepper are extracted with methyl alcohol, after the evaporation of the solvent the residue is treated with a cold solution of potassium carbonate which dissolves the resinous substances leaving the piperine; this is washed with water, recrystallized from alcohol, dried at 100° and weighed. From the alkaline solution the resin can be precipitated by hydrochloric acid. The specimens contained approximately 14 per cent. moisture; the figures relate to dry material:

	Piperine.	Resin.
Black pepper,	7.14 per cent.	1.44 per cent.
“ “ (Trang.)	6.62 “	0.82 “
White “	6.47 “	0.69 “
Long “	4.24 “	1.16 “

T. Stevenson (*Analyst Zschr. f. Nahrungsm. Unters.*, 1888, 135.

Iodoformium bituminosum is made by incorporating iodoform with tar in such a manner that an almost odorless preparation results; the process remains a secret. In larger quantities the odor of tar is per-

ceptible; if the preparation is mixed with a large quantity of water the iodoform odor becomes prominent.—*Rdsch.*, 1888, 640.

Test for Glycerin.—The property of glycerin to displace boric acid in borax is used in the following manner: The solution to be tested and a solution of borax are slightly colored by addition of a few drops of litmus solution and the two blue liquids mixed; in presence of glycerin the liquid is reddened, owing to the liberation of boric acid. The red color on heating becomes blue, but, on cooling, reappears.—*Pharm. Post*, 1888, 487.

Ferrum Peptonatum.—75.0 fresh egg albumen (10.0 dried) are dissolved in 1000.0 distilled water; to this is added 18.0 hydrochloric acid and 0.5 pepsin, and digested at 40° until a portion produces only a faint turbidity with nitric acid; allow to cool, neutralize with soda solution, strain and mix the liquid with 120.0 solution of oxychloride of iron and 1000.0 distilled water. The fluid is now *exactly* neutralized with diluted soda solution, and the precipitate washed by decantation with distilled water until the washings produce no turbidity with silver nitrate. The precipitate is collected on a wet linen strainer, drained, placed in a porcelain capsule, 1.5 hydrochloric acid added and heated, with stirring, on a water-bath until a clear solution results, which is concentrated, spread upon glass plates and dried at 20° to 30°, to yield a scale preparation, or from which is made

Liquor Ferri Peptonati by diluting with distilled water to 900.0 and adding 100.0 spirit of cognac.

The so-called "Indifferent Iron-preparations," to which class the above belongs, are very sensitive towards carbonic acid and sodium chloride, and in their manufacture it is essential to work as rapidly as possible, and to use distilled water, which has been heated, to expel CO₂, and again allowed to cool.—E. Dieterich, *Pharm. Centrhl.*, 1888, 316.

Peptone is pronounced by Palm (*Ztschr. f. An. Chem.*) to be a solution of albumen in acids. The action of lactic acid upon various albumens is to form peptone. This is also produced by the action of the same acid upon glue, chondrin and fibrin. By adding ether to an alcoholic peptone solution, a peptone of constant composition is separated as an oily mass, which contains the lactic acid and protein in stoichiometrical proportions. Albumen may be reprecipitated from peptone solutions by neutralizing the acid and adding 95 per cent. alcohol; alcohol acidulated with sulphuric acid will likewise precipitate the albu-

men, if too much acid be not present. The non-coagulation of the peptone is due to the solubility of coagulated albumen in lactic acid; but on first neutralizing with ammonia boiling will coagulate peptone solutions. The explanation of the same composition of albumen and peptone is found in the fact that in the so-called purification of the peptone the albumen was always reobtained. Peptone will reduce Fehling's solution, which is of importance in milk analysis.

A distinctive test is the addition of potassium xanthogenate; with albumen solutions, a precipitate is only obtained on addition of acid, while peptone solutions, being acid, give a precipitate at once.—*Pharm. Centrbl.*, 1888, 395.

Tasteless Quinine Tannate is made as follows: Quinine sulphate 40 parts is dissolved in distilled water 1200 parts with aid of the least possible quantity of dilute sulphuric acid, filtered and, with continued stirring, a solution of 80 parts tannic acid in 560 parts distilled water added. After standing 24 hours, filter and wash the precipitate with 400 parts distilled water; by slight pressure remove the excess of water from the precipitate and heat with 200 parts distilled water until it fuses to a transparent yellowish resinous mass which, after cooling, is powdered.—(*Hung. Pharmacop.*) *Rdsch.*, 1888, 621.

Chelidonine has been studied by Dr. A. Henschke, who obtained 0.29 per cent. from the root of *Chelidonium majus*. The formula for the crystallized alkaloid is $C_{20}H_{19}NO_5 + H_2O$; after drying at 100° it melts at 135° . It is a tertiary base; with alkaline potassium permanganate, the oxidation products are CO_2 , $H_2C_2O_4$, CH_3NH_2 ; with acid permanganate only CO_2 and CH_3NH_2 are obtained; nitric acid gives rise to CO_2 , $H_2C_2O_4$, CH_3NH_2 and a red resinous substance forming a carmine red solution on addition of KOH or NaOH.—*Arch. der Pharm.*, 1888, 624.

Cortex Frangula and *Cascara Sagrada*.—P. Schwabe on examination of the former bark finds it to contain two crystalline principles, *emodin*, identical with frangulinic acid, and *frangulin*. This latter body is a glucoside of the formula $C_{21}H_{20}O_9$, almost insoluble in water and ether, more soluble in boiling alcohol, chloroform and benzol, easily soluble in hot glacial acetic acid, melts at 228° – 230° and is decomposed by alkali and acid into *emodin* $C_{15}H_{10}O_5 + H_2O$, melting at 254° , and a sugar $C_6H_{12}O_5$, possibly identical with *rhamnoglucit* $C_{21}H_{20}O_9 + H_2O = C_{15}H_{10}O_5 + C_6H_{12}O_5$.

From an older bark 0.04 per cent. frangulin and 0.1 per cent. emo-

din were obtained; in the fresh bark neither principle could positively be detected, indicating that they were formed on aging. The bark of *Rhamnus Purshiana* examined was probably of the previous year's collection. It contained *emodin*, 0.05 per cent.; *frangulin* which possibly forms with age could not be detected.—*Arch. der Pharm.*, 1888, 569.

Fat Determination in Milk, Cream, etc.—Place 5 cc. cream or 10 cc. milk (carefully measured) into a test-glass of 50 cc. capacity graduated into $\frac{1}{10}$ cc., add 10 cc. concentrated hydrochloric acid, boil while rotating the liquid and agitate the cold dark-brown fluid with 30 cc. ether. After this separates clearly read off the volume of the ethereal layer, remove 10 cc. with a pipette, allow to flow into a tared porcelain crucible, evaporate on a water-bath, dry in an air-bath at 100° and weigh. Calculate the weight for the volume read off. This determination can be made in about 15 minutes and the results do not differ by 0.1 per cent. from those gotten by other quantitative methods.—Dr. W. Schmidt (*Ztschr. f. an. Chem.*) *Chem. Rpt.*, 1888, 221.

NEW FORMULÆ FROM THE UNOFFICIAL FORMULARY, B.P.C., 1888.

ACETUM IPECACUANHÆ.

Vinegar of Ipecacuanha.

Take of—

Ipecacuanha root, in No.
20 powder..... 1 oz.
Acetic acid 2 fluid oz.
Distilled water, q. s.

Macerate the powder in 1 ounce of the acid for twenty-four hours, and then pack in a percolator. Mix the remainder of the acid with 10 ounces of distilled water, and percolate with the mixture, continuing the percolation with distilled water until 1 pint* of the vinegar is obtained.

Dose: 5 to 40 minims as an expectorant.

ELIXIR PHOSPHORI.

Elixir of Phosphorus.

Take of—

Comp. tinct. of phosphor. 4 fluid oz.
Glycerin 16 "

Add the tincture to the glycerin and shake well. This elixir should be preserved from the light. Each fluid drachm contains $\frac{1}{16}$ grain of phosphorus.

Dose: 15 minims to 1 fluid drachm.

ELIXIR SACCHARINI.

Elixir of Saccharin.

Take of—

Saccharin † 480 grains.
Bicarbonate of sodium 240 "
Rectified spirit..... 2½ fluid oz.
Distilled water, q. s.

Rub the saccharin and bicarbonate of sodium in a mortar, with half a pint of distilled water gradually added. When dissolved, add the spirit, filter, and wash the filter with sufficient distilled water to produce 1 pint of elixir.

* 1 imperial pint—20 fluid ounces—8760 grains of water.
† Benzoyl-sulphonic-imide—a patented preparation.

Each fluid drachm contains 3 grains of saccharin.

Dose; 5 to 20 minims.

EMULSIO OLEI MORRHUE, II.

Emulsion of Cod Liver Oil.

Take of—

Cod liver oil.....	8 fluid oz.
The yolks of two eggs.	
Tragacanth, in powder...	16 grains.
Elixir of saccharin.....	1 fl. drm.
Simple tinct. of benzoin..	1 "
Spirit of chloroform.....	4 "
Essential oil of bitter almonds	8 minims.
Distilled water, sufficient to produce.....	16 fluid oz.

Measure 5 fluid oz. of the distilled water, place the tragacanth in powder in a dry mortar, and triturate with a little of the cod liver oil; then add the yolks of eggs, and stir briskly, adding water as the mixture thickens. When of a suitable consistence, add the remainder of the oil and water alternately, with constant stirring avoiding frothing. Transfer to a pint bottle, add the elixir of saccharin, tincture of benzoin, spirit of chloroform, and oil of almonds previously mixed, shake well, and add distilled water, if necessary, to make the product measure 16 fluid oz.

Dose: 2 to 8 fluid drachms.

EXTRACTUM TRITICI LIQUIDUM.

Liquid Extract of Triticum.

Take of—

Triticum rhizome, in No.	
20 powder.....	10 oz.
Rectified spirit } of each, q. s.	
Distilled water }	

Moisten the powder with 4 fluid ounces of distilled water, pack in a percolator, and pour boiling distilled water upon it until it is exhausted. Evaporate the percolate to 15 fluid ounces, add to it 5 fluid ounces of rectified spirit, mix, and set aside for forty-eight hours. Then filter the

liquid, and add to the filtrate enough of a mixture composed of 3 fluid parts of distilled water and one of rectified spirit to make the liquid extract measure 1 pint.

Dose: 1 to 6 fluid drachms.

LIQUOR FERRI HYPOPHOSPHITIS FORTIS.

Strong Solution of Hypophosphite of Iron.

Take of—

Sulphate of iron.....	760 grains.
Hypophosphite of barium.....	830 "
(Containing not less than 95 per cent. of Ba. 2 (PH ₂ O ₂)H ₂ O.)	
Diluted sulphuric acid.....	100 minims.
Distilled water.....	1 pint.

Put the sulphate of iron with 5 fluid ounces of distilled water in a tall 24-oz. bottle, and shake till dissolved. Dissolve the hypophosphite of barium in the remaining 15 fluid ounces of distilled water, and add slowly to the former solution. Shake and add the diluted sulphuric acid; again shake and set aside for two days, then syphon off the clear liquid. Keep it in bottles quite full and in a dark place.

Each fluid drachm contains about 5 grains of hypophosphite of iron. The solution has an acid reaction, and it should not give more than a faint precipitate, if any, with either diluted sulphuric acid, or solution of chloride of barium.

Dose: 10 to 30 minims.

LIQUOR HYPOPHOSPHITUM COMPOSITUS.

Compound Solution of Hypophosphites.

Syn.—Liquor Ferri Hypophosphitis Compositus.

Take of—

Hypophos. of calcium.....	320 grains.
Hypophos. of sodium.....	320 "
Hypophos. of magnesium.....	160 "
Strong solution of hypophosphite of iron.....	6 fluid oz.
Hypophosphorous acid,	
30 p. c.....	½ fluid oz.
Distilled water, q. s.	

Dissolve the hypophosphites of calcium, sodium, and magnesium in 12 fluid ounces of distilled water; add the solution of hypophosphite of iron and the hypophosphorous acid. Filter, and make up to 1 pint by the addition of distilled water.

Each fluid drachm contains about 2 grains each of hypophosphite of sodium and calcium, 1 grain of hypophosphite of magnesium, and $1\frac{1}{2}$ grains of hypophosphite of iron.

Dose: $\frac{1}{2}$ to 2 fluid drachms.

SYRUPUS CODEINÆ.

Syrup of Codeine.

Take of—

Codeine, in powder.....20 grains.
Proof spirit..... $1\frac{1}{2}$ fluid oz.
Distilled water.....1 " "

Dissolve and add
Syrup, sufficient to produce.....1 pint.

Dose: $\frac{1}{2}$ to 2 fluid drachms.

SYRUPUS FERRI BROMIDI.

Syrup of Bromide of Iron.

Take of—

Iron wire, free from oxide..... $\frac{1}{2}$ oz.
Bromine.....553 grains.
Refined sugar.....14 oz.
Distilled water q s.

Dissolve the sugar in 6 ounces of distilled water, by the heat of a water-bath. Put the iron wire with 4 ounces of distilled water into a glass flask, having a capacity of at least 1 pint, and surround it with cold water. Then add the bromine in successive quantities; shake occasionally until the froth becomes white, and the reaction is complete. Filter the solution into the warm syrup, and add, if necessary, distilled water sufficient to produce 1 pint.

Each fluid drachm contains about $4\frac{1}{2}$ grains of bromide of iron.

Dose: $\frac{1}{2}$ to 1 fluid drachm.

SYRUPUS FERRI HYPOPHOSPHITIS.

Syrup of Hypophosphite of Iron.

Take of—

Strong solution of hypophosphite of iron.....4 fluid oz.
Syrup.....16 " "
Mix.

Each fluid drachm contains about 1 grain of hypophosphite of iron.

Dose: $\frac{1}{2}$ to 2 fluid drachms.

SYRUPUS FERRI ET QUININÆ HYDROBROMATUM.

Syrup of the Hydrobromates of Iron and Quinine.

Syn.—Syrupus Ferri Bromidi cum Quinina.

Take of—

Acid hydrobromate of quinine.....160 grains.
Diluted hydrobromic acid.....1 fluid oz.
Distilled water.....1 " "

Mix the diluted hydrobromic acid with the distilled water, and in the mixture dissolve the acid hydrobromate of quinine. Then add

Syrup of bromide of iron
sufficient to produce...1 pint.

Each fluid drachm contains 1 grain of acid hydrobromate of quinine, and about 4 grains of bromide of iron.

Dose: $\frac{1}{2}$ to 1 fluid drachm.

SYRUPUS FERRI QUININÆ ET STRYCHNINÆ HYDROBROMATUM.

Syrup of the Hydrobromates of Iron, Quinine, and Strychnine.

Syn.—Syrupus Ferri Bromidi cum Quinina et Strychnina.

Take of—

Strychnine, in powder...2 $\frac{1}{2}$ grains.
Acid hydrobromate of quinine.....160 "
Diluted hydrobromic acid.....1 fluid oz.
Distilled water.....1 " "

Mix the diluted hydrobromic acid with the distilled water, and in the

mixture dissolve the strychnine and acid hydrobromate of quinine, by the aid of a gentle heat. Then add

Syrup of bromide of iron, sufficient to produce.....1 pint.

Each fluid drachm contains $\frac{1}{4}$ grain of strychnine, 1 grain of acid hydrobromate of quinine, and about 4 grains of bromide of iron.

Dose: $\frac{1}{2}$ to 1 fluid drachm.

SYRUPUS HYPHOPHOSPHITUM COMPOSITUS.

*Compound Syrup of Hypophosphites.**

Take of—

Quinine (alkaloid).....20 grains.
Strychnine..... 1 "
Hypophosphorous acid,
30 p. ct..... 2 fluid drms
Strong solution of hy-
pophosphite of iron.. 3 fluid oz.

Dissolve and add

Hypophosphite of cal-
cium.....80 grains.
Hypophosphite of man-
ganese.....40 "
Hypophosphite of po-
tassium.....40 "

Dissolve, filter, and add

Syrup sufficient to pro-
duce..... 1 pint.
Mix.

Each fluid drachm contains $\frac{1}{16}$ grain of strychnine and $\frac{1}{2}$ grain of quinine.

Dose: $\frac{1}{2}$ to 2 fluid drachms.

SYRUPUS IPECACUANHÆ ACETICUS.

Acetic Syrup of Ipecacuanha.

Take of—

Vinegar of ipecacuanha.....1 pint.
Refined sugar.....2½ pounds
Dissolve by the aid of a gentle heat. Specific gravity about 1.33.
Dose: $\frac{1}{2}$ to 2 fluid drachms.

* This differs essentially from the syrup of same name in "National Formulary."

SYRUPUS PRUNI VIRGINIANÆ.

Syrup of Wild Cherry.

Take of—

Wild cherry bark, No.
20 powder..... 3 oz.
Refined sugar, in coarse
powder.....15 "
Glycerin..... 1½ fluid oz.
Distilled water, a sufficient quantity.

TINCTURA CALENDULÆ FLORUM.

Tincture of Marigold Flowers.

Take of—

Marigold flowers, dried, in No.
20 powder..... 4 oz.
Proof spirit, a sufficient quantity.

Moisten the powder with eight fluid ounces of the menstruum, and macerate for twenty-four hours. Then pack in a percolator, and gradually pour proof spirit upon it until 1 pint of tincture is obtained.

Dose: 5 to 20 minims.

TINCTURA CAPSICI FORTIOR.

Stronger Tincture of Capsicum.

Take of—

Capsicum fruit, in No. 40 pow-
der.....10 oz.
Rectified spirit, a sufficient quantity.

Moisten the powder with a suitable quantity of the menstruum, and macerate for twenty-four hours in a closed vessel. Then pack in a percolator, and gradually pour rectified spirit upon it until 1½ pint of tincture are obtained.

Dose: 1 to 3 minims. Principally used externally.

TINCTURA EUONYMI.

Tincture of Euonymus.

Take of—

Euonymus bark, in No. 20
powder.....4 oz.
Rectified spirit.....1 pint.
Moisten the powder with a suitable quantity of the menstruum, and macerate for twenty-four hours; then pack in

a percolator, and gradually pour rectified spirit upon it until 1 pint of tincture is obtained.

Dose: 10 to 40 minims.

TINCTURA PHOSPHORI COMPOSITA.

Compound Tincture of Phosphorus.

Take of—

Phosphorus.....12 grains.
Chloroform..... 2½ fluid oz.

Place in a stoppered bottle, and apply the heat of a water-bath until dissolved. Then add the solution to

Ethyl alcohol.....12½ fluid oz.
Shake well. This tincture should be preserved from the light, in accurately-stoppered bottles.

Each fluid drachm contains $\frac{1}{8}$ grain of phosphorus.

Dose: 3 to 12 minims.

UNGUENTUM OLEO-RESINÆ CAPSICI.

Ointment of Oleo-Resin of Capsicum.

Take of—

Oleo-resin of capsicum.....1 oz.
Yellow wax..... ½ “
Benzoated lard.....4 “

Melt the wax and lard at a low temperature, add the oleo-resin, mix thoroughly, and, if necessary, strain through muslin. Stir until cold.

Phar. Jour. and Trans., Sep. 8.

AMERICAN PHARMACEUTICAL ASSOCIATION.

The city of Detroit having been selected for holding the thirty-sixth annual meeting, the local Secretary, Mr. James Vernor, efficiently aided by a local committee, had made ample preparations for the accommodation of a large number of visitors, and for a very extensive exhibition of drugs, chemicals, galenicals and other objects of interest to pharmacists and druggists. The exhibition was held in the Detroit Rink, on Larned street, a spacious building which was handsomely fitted up for the purpose, the various collections being shown to advantage. Numerous visitors were constantly in attendance examining the interesting, and in many instances, instructive exhibits.

The sessions were held in the armory of the Detroit Light Infantry, located on Congress street, the entire building having been secured for the use of the Association. The parlors were specially reserved for the ladies; but one of the parlors was subsequently used for holding the meetings of the Sections while the general sessions took place in the large hall on the top floor, which was also utilized for the reception tendered to the officers of the American and of the Michigan State Pharmaceutical Associations, and for the hop following the reception on Wednesday evening.

At the Hotel Cadillac the Council held a short meeting on Sunday evening and a protracted session on Monday morning for the reception of the various reports and for arranging the business which was to come before the Association.

The first general session was held on Monday afternoon at 3.30 o'clock, when President Lloyd called the Association to order, and was followed by Rev. Dr. Henderson, who opened the sessions with prayer. The mayor of the city being prevented from being present, Hon. Wm. E. Maybury, on behalf of the city of Detroit made an address of welcome, stating that the pharma-

ceutical manufactories of Detroit were the pride of the city, and as colaborers of these institutions the members of the association were welcomed. He spoke of the advancement of pharmacy from the time when the virtue of medicines seemed to be governed by their quantity and bitterness, until now the little tasteless capsule has no terror for the patient and is taken with as little concern as soda water at the soda fountain. The association was welcomed from the heart of humanity. No man so welcome as the physician who strives to alleviate and remove pain, but the labors of the physician would be futile if the high calling of the pharmacist were not discharged with a sense of high duty. Vice-president Alexander responded briefly, accepting the hospitalities tendered, and Professor Judge was then requested to read the President's annual address.

The address is very lengthy and contains a number of suggestions and propositions which would form ample material for reflection and discussion at the annual meetings. In the introductory portion the President suggests whether full membership should not be restricted to "actual apothecaries, personally engaged in dispensing medicines," and he expresses the conviction that the association had been "designed by its founders. . . . to be made up of apothecaries only." The latter is evidently a mistake; for at the organization of the association in 1852 men were present who were *not* carrying on the apothecary's business, and the constitution then adopted distinctly admits to membership "all pharmacists and druggists who etc." Moreover on motion of one of the original members, Mr. S. M. Colcord, at the meeting in 1855 the words were introduced "whether in business on his own account, *retired from business*, or employed by another;" and in 1867 the Business Committee, Dr. Squibb chairman, brought in an amendment which was unanimously adopted, making eligible "those *teachers of pharmacy, chemistry and botany*, who may be specially interested in pharmacy and materia medica." These are facts on record in the published proceedings for the years named, and express the views held by the founders and the early members of the association.

The various problems mentioned, and comments made by the President may be briefly stated as follows:

1. Members should encourage apprentices in obtaining pharmaceutical education and in making pharmaceutical preparations.
2. The influence of modern pharmaceutical factories is sketched.
3. The drift of the times points to the necessity of the apothecary of the future graduating in medicine as well as in pharmacy.
4. Can pharmacists pay a percentage to physicians for prescription favors?
5. The prescribing, under assumed names, of mixtures, keeping the formulas secret, is not consistent with pharmaceutical ethics, and is neither elevating nor dignified in either participant.
6. Legislative action requiring the label of each patent medicine to plainly indicate the composition.
7. Counter prescribing considering the right of an individual to *self-medication*, and the qualification of the recommender.
8. Patents for improvements on apparatus applicable to the preparation of pharmaceuticals and chemicals.
9. Patents for synthetical processes for medicinal agents.
10. The sale of patented, trade-marked or copyrighted preparations.

11. The manufacture of secret mixtures for popular self-medication.
12. The selling of secret preparations by apothecaries.
13. The manufacture of secret preparations in bulk for others.
14. The exclusive use of a trade-marked name invented for a simple mixture.
15. The protection by trade-mark or copyright for prints, labels, etc.
16. The copyrighting of books written exclusively for pharmacists and physicians.
17. The dispensing of preparations protected by copyright, patent or trade-mark. [See No. 10].
18. The manufacture of pharmaceutical preparations, for which the ingredients are given, but the working process is withheld.
19. Property in advantageous methods for preparing valuable constituents from crude drugs.
20. The use by the pharmacopoeia of the results of individual research.
21. Is it proper to label a substance as though manufactured by us when in reality it is only selected or perhaps purified?
22. The introduction into the pharmacopoeia of liquid preparations representing in two minims one grain of the drug.
23. The election, besides a president, of a presiding chairman with parliamentary experience and knowledge.
24. Rigid examinations by state boards and education of assistants at colleges of pharmacy.
25. Salaries to the secretaries of sections.

The President's address was referred to a committee consisting of John Weyer of Cincinnati; J. L. Lemberger of Lebanon, Pa., and Geo. W. Sloan of Indianapolis. The report on credentials being presented showed that delegates had been appointed by the Colleges of Pharmacy of California, Chicago, Cincinnati, Louisville, Maryland, Massachusetts, New York, Ontario, Philadelphia, Pittsburg, St. Louis and Washington (National); by the State Pharmaceutical Associations of Alabama, Arkansas, Connecticut, Dakota, (North and South,) Delaware, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, Tennessee, Virginia, Wisconsin and of the Province of Quebec; by the Alumni Associations of the Chicago, Cincinnati, Louisville, Philadelphia and St. Louis Colleges of Pharmacy; and by the local associations of Cleveland, Connecticut River, N. H., Dauphin Co., Pa., Detroit, and Kings Co., N. Y., and the St. Louis Club of Microscopists. When the Nominating Committee was subsequently appointed, it was found that from ten of the states mentioned no delegates were present, or they had not arrived. The delegations of each state named two members to serve on the Nominating Committee, and the President appointed from the Association at large the following members not delegates: A. E. Ebert, William Dupont, E. Bocking, John Ingalls and J. F. Judge.

The Secretary of Council read the names of 126 persons proposed for membership all of whom were invited to join; the total number of new members proposed and elected at the meeting was 215. Afterward the minutes of Council since the last meeting of the association were read. These minutes referred to the incorporation of the Association under the laws of Congress, the publica-

tion of the National Formulary, the examination of the treasurer's books, the reports of committees, etc. The minutes were approved and the reading of the reports postponed until the next session. Several amendments to the by-laws were offered and laid over, and an invitation from the California College of Pharmacy was extended for holding the next meeting in San Francisco. This brought forth a proposition for the appointment of a committee of fifteen—twelve to be nominated from the floor, and three by the chair—whose decision as to the time and place of the next meeting should be final, provided that two public hearings be given. The proposition was voted down and a motion for the appointment of a committee of three prevailed, this committee to report at the next session. Messrs. Painter, Remington and Bedford were appointed this committee, and an adjournment was had until Tuesday morning.

Second Session.—The first business transacted after the approval of the minutes of the first session and of the Council's session, was the election of the following officers for the ensuing year :

M. W. Alexander, St. Louis, Missouri, president; James Vernor, Detroit, F. Wilcox, Waterbury, Conn., A. A. Yeager, Knoxville, Tenn., vice-presidents; S. A. D. Sheppard, Boston, treasurer; J. M. Maisch, Philadelphia, secretary; and Henry Canning, Boston, C. L. Keppler, New Orleans, and Emlen Painter, New York, members of Council for three years.

A cable message conveying "fraternal greetings from British Pharmaceutical Conference meeting at Bath," and signed by the President, F. Baden Bengel, was read, and ordered to be acknowledged. It is strange that when the secretary stated that the Conference was no longer in session, none of the members present appeared to be better informed; hence the acknowledgment was not sent by cable, but subsequently by letter.

Greetings by telegraph were also received from ex-President William Saunders, then sojourning at Victoria, British Columbia, in the service of the Canadian government.

Prof. Diehl read the introductory portion of his report on the progress of pharmacy, which created some discussion. On the alleged substitution by Berlin apothecaries, Dr. James, of St. Louis, stated that prescriptions ordering bogus remedies had been gotten up by homœopathic practitioners and sent to homœopathic dispensaries, at some of which the prescriptions were dispensed. The intercourse between physicians and pharmacists in scientific societies was discussed by Dr. F. E. Stewart, Prof. Remington and Dr. Eccles, and the good results for both professions from such an intercourse were pointed out; it was contended that the progressive members of both professions favored such a step, and that a section on pharmacy in the American Medical Association should have a counterpart in a section on therapeutics in the American Pharmaceutical Association.

Mr. De Forest read the final report of the Committee on National Formulary, giving an account of the manner in which the work was finished, and making various suggestions, those relating to a future revision of the Formulary being embodied in two resolutions which were adopted as follows :

Resolved, that a Committee on National Formulary be appointed at the Annual Meeting following the publication of a revision of the work, the said committee to hold office, unless otherwise directed by the Association until their

successors are appointed at the Annual Meeting succeeding the issue of a revision, and to report at each meeting of the Association.

Resolved, that the Council of the American Pharmaceutical Association shall have authority, upon the recommendation of the Committee on National Formulary, to make all necessary arrangements for the publication of a revised edition, and to provide for its distribution and sale.

A motion was also made by Professor Painter, that a heartfelt vote of thanks be extended to those pharmacists not members of the committee who had rendered assistance. The motion was amended so as to include likewise the members of the committee, and to make special mention of its chairman, Dr. Chas. Rice. In this amended form the resolution was passed.

Pending a motion for the appointment of a new Committee on National Formulary, the matter was referred to the scientific section. The Association ordered the publication of the Formulary with the Proceedings for 1888.

The various reports coming from Council were now read. The Committee on Publication reported the total cost of publishing the Proceedings for 1887 to have been \$3794.52, and suggested that hereafter the Proceedings as a general rule, be distributed by mail also in the larger cities to avoid delay. Of the National Formulary two editions of 3,000 copies each had been exhausted in ten days each, and the third edition had been put on the market August 31st.; to comply with the direction to "sell it at the lowest price possible after paying all expenses," the calculation was made so close that the profit on the cost of paper, presswork, binding and shipping was less than four cents each for the first 3,000 copies, and about 11 cents each on the first 6,000 copies sold; the actual average profit, however, was somewhat greater, and is expected to ultimately reimburse the Association for all expenses connected with the Formulary.

The reports of the Treasurer and of the Auditing and Finance Committees account for a total income, during the financial year of \$12,656.49 which includes the cash balance on hand in 1887; the total disbursements during the year, including \$4000 transferred to the life membership fund, were \$10,280.42, leaving cash on hand \$2,376.07. In addition to this there are permanent funds, invested in U. S. bonds, the interest alone being used; the market value of these funds was as follows: Ebert fund \$796; Centennial fund \$1,427.10, and Life Membership fund \$9,124.72.

The Committee on Membership reported the roll to contain 1257 members, against 1291 the preceding year, the decrease being mainly due to a number of resignations in previous years, and to 21 deaths during the preceding years, the latter including four former presidents, Lincoln, Luhn, Moore and Roberts.

The report of the Committee on the time and place of the next annual meeting stated that invitations had been received from St. Paul and Minneapolis jointly, from Asbury Park, New Orleans and San Francisco, and that the Committee was unanimous in proposing San Francisco for holding the meeting in 1889. The report was adopted by a vote of 47 against 7 nays; and a Committee of five was directed to be appointed to make all arrangements, with power and to report to the Council.

The amendments previously offered to the by-laws were now considered and adopted as follows:

Chapt. vi., Art. iv. The Secretary of the Council may, or may not, be a member of Council.

Chapt. vi., Art. viii., Sect. 2, relating to the proposition of members was merely changed in phraseology.

Chapt. viii., Art. iv. The life membership fees were fixed for members after 25 years at \$30, after 30 years at \$20, and after 35 years at \$10.

The Section on Commercial Interests held two sessions on the afternoon and evening of Tuesday, Sept. 4. The chairman, A. H. Hollister, and Secretary, J. W. Colcord, were re-elected. The secretary's report suggested that the State Associations be requested to send to this section any suggestion for trade improvement.

A resolution laid over from last year was adopted as follows:

Resolved, That the Secretary of the Section on Commercial Interests be directed to correspond with manufacturers and dealers requesting them to label their products in conformity with the official nomenclature, and to designate strengths by the specific gravity or percentage strength, abolishing arbitrary signs and obsolete standards, such as "F" marks and Beaumé, and that the co-operation of the National Wholesale Druggists Association towards securing said result be solicited.

A committee consisting of Frederick Wilcox, Waterbury, Conn., J. F. Patton, York, Pa., and A. K. Finlay, New Orleans, was appointed to examine and report upon exhibits.

A resolution offered by Mr. Canning requesting manufacturers not to sell rebate goods to firms retailing the same in their wholesale stores, was referred to a committee consisting of Messrs. Canning, Hallberg and Eccles. The report presented by that committee at the evening session was fully discussed and led to the indefinite postponement of the subject.

There was some discussion about the substitution of preparations by different manufacturers, but no action was taken.

At the evening session the Michigan Pharmaceutical Association, whose annual meeting was being held the same week, was present in a body. The chairman, Mr. Hollister, read his annual address dwelling upon the necessity of pharmacists employing all the means which the educational advantages of the present time afford. The apprentice should be of unimpeachable character, have at least a thorough common-school education, and should be afforded opportunity and assistance for improvement. The relation of the physician and the pharmacist should be defined in a straightforward business-like way. Drug stores being classed as hazardous and extra-hazardous, the question of fire insurance calls for concerted action. The tariff on medicines calls for careful consideration, and the \$25 United States revenue tax should be wiped out. The cultivation of medicinal plants is of economic importance, and should be encouraged by Congress. The "cutting craze" was alluded to, and the question was asked: Why should wholesalers injure the business of their correspondents and customers by retailing goods at less than marked rates, and even at rates as contemptible as those offered by the scalper?

Mr. Frank Wells read a paper on the liquor question, as affecting pharmacists.

The different recommendations in the chairman's address were discussed and concurred in. A motion by Mr. Hallberg in favor of the abolition of the special internal revenue tax on the sale of liquor was adopted. A similar resolution had been passed in 1887.

There was some discussion on cutting of prices, on enforcement of pharmacy laws, on definition of "the best general exhibit," and kindred subjects. The Chairman completed the Committee on Commercial Interests by appointing Messrs. Eliel, of Indiana; Holzhauser, of New Jersey, and Searby, of California, and the section subsequently adjourned.

The Section on Scientific Papers held two sessions on Wednesday, and one on Thursday forenoon. The Chairman, Mr. T. Roberts Baker, and the Secretary, Dr. A. B. Lyons, being both absent, the Section was called to order by the third member of the committee, Prof. Good, who presided until, before the final adjournment, the new committee was installed consisting of Prof. E. Painter, New York, chairman; Prof. Whelpley, St. Louis, secretary, and Dr. Eccles, Brooklyn. The papers read were as follows:

Artificial Salicylic Acid; by E. E. Ewell and A. B. Prescott. The paper treated of methods for estimating the quantities of homologous acids present with salicylic acid, and referred first to acidimetry by means of $\frac{1}{10}$ normal alkali in the presence of phenolphthalein. The acids taken into consideration were salicylic acid (137.67), hydroxytoluic acid (151.64) and hydroxy-xyleneic acid (165.61); the experimental results showed that with the use of sufficiently delicate and verified instruments 4 or 5 per cent. of hydroxytoluic acid may be detected, other interfering impurities being absent.

Another method tried was conversion into phenols by distilling 15 gm. of the acid with an equal weight of lime; the distillate—if necessary liquefied by adding a little water—was mixed with an equal volume of 9 per cent. sodium hydrate, and the clear mixture diluted with water, until after stirring there remained visible precipitation. The method can be made effectual probably with closer results than those obtained by acidimetry. Preliminary experiments with mixtures of cresylic and carbolic acids had given the following results:

Volume per cent. of cresol in the distillate.	Calculated weight per cent. of hydroxy-toluic acid distilled.	After adding an equal volume of 9% sol. of soda, number volumes of water added before precipitation.
5	4.9	6.7
10	9.8	6.0
15	14.8	5.25
20	19.8	4.5
25	24.7	4.0
30	29.7	3.6
35	34.7	3.3
40	39.7	3.1
45	44.7	2.8
50	49.7	2.6

The third method tried was separation of the acids by the difference in solubility of their calcium salts; but the results were not promising.

Calycanthus seed.—The seeds of *Calycanthus glaucus*, Willd., are reported, in the Southern states, to be poisonous to animals, producing symptoms resembling those following the use of strychnine. Dr. R. G. Eccles has isolated from the seeds a minute quantity of a new alkaloid, *calycanthine*, which is slightly

soluble in water, but very soluble in ether or chloroform, while the salts are insoluble in the latter liquids, but freely soluble in water. Strong nitric acid colors the alkaloid green; and potassa saponifies it, producing a crystallizable alkaloid and a strong sweet odor resembling ylang-ylang. The bark, leaves and flowers of calycanthus contain essential oil, but the seed is free from it.

Quinine mask.—L. F. Stevens, after making over one hundred test experiments for masking the taste of quinine, succeeded in making an efficient preparation, which was admitted into the National Formulary under the name

Aromatic Elixir of yerba santa.—It is made by agitating together 8 fluidounces each of compound elixir of taraxacum and syrup with 240 grains of powdered pumice, then adding 1 fluidounce of fluid extract of yerba santa; after a few hours decant and filter through cotton; agitate the filtrate with 80 grains of magnesium carbonate, and after several hours filter. A fluid drachm of this elixir, mixed by agitation with 5 grains of quinine sulphate, completely covers the taste of the latter. The elixir, as well as its mixture with quinine, improves with keeping.

In the discussion following the reading of this paper it was stated that the compound elixir of taraxacum of the National Formulary covered the taste of quinine completely, but that its taste was not very agreeable.

Peppermint Oil.—Prof. A. B. Stevens found the polarizing power of menthol, both Japanese and American, to be from -95° to -100° ; the dementholized oil of peppermint has a polarizing power lower than that of the oil from which it was obtained. The volatile oils of camphor, pennyroyal and turpentine have a right rotation, and when mixed with oil of peppermint lessen the levogyre rotation of the latter. A drachm of nitric acid agitated with a drop of pure oil of peppermint will produce a permanently yellow mixture, which in the presence of oil of camphor becomes red in 15 or 20 minutes. Experiments were also made with the decolorizing of iodine by oil of peppermint, the reaction being interfered with by the presence of alcohol.

Professor Trimble's papers on *Catechu* and on *precipitated ferrous sulphate* are published in full in this number.

Nomenclature of Pharmaceutical Preparations is the title of a short suggestive paper by C. S. Hallberg, directing attention to the different strengths of the various preparations of one class, and pointing out that the relative strength might likewise be indicated in the name by the use of Latin numerals. These, combined with the last syllable of the present class name, might then do service for indicating the drug strength of the preparation; accordingly we would have—

Drug Strength by Volume.		Drug Strength at One Hundred.	
100 = Cen-ture.	30 = Tri-ture.	100 = Cen-tract.	30 = Tri-tract.
50 = Quin-ture.	20 = Vin-ture.	50 = Quin-tract.	20 = Vin-tract.
40 = Qua-ture.	10 = De-ture.	40 = Qua-tract.	10 = De-tract.
			5 = Quinte-tract.

The subject was referred to the Committee on the Revision of the U. S. Pharmacopœia, and in the discussion which followed it seemed to be generally admitted that a more precise nomenclature might be devised, at least for preparations of different strength or made with different menstrua, which are at present designated by the same generic name.

Loco-weed.—*Astragalus mollissimus* is the plant which in Kansas and other localities is known as loco weed, and which has been believed to be poisonous to horses and cattle. Occasionally a similar plant, having a hairy pod—probably *Astragalus Bigelovii*—is said to be equally poisonous; and in certain localities, where these species do not grow, *Oxytropis Lamberti* is regarded as loco- or poison weed. Professor Sayre's investigations, extending over a period of three years, render it very doubtful whether these plants really possess any poisonous properties, since chemical investigation has thus far failed to reveal the presence of a poisonous principle, and the plant or extract given to animals, or taken by man, produced no bad effects. Occasion is taken in the paper to point out the importance of scientific investigation, and reference is made to an enactment of Colorado, offering a bounty of 1½ cents for each pound of loco-weed (dried) dug up at least three inches below the surface of the ground, with the view of eradicating it. About \$200,000 have thus far been expended by the State for this purpose, and now it seems probable that the plant is harmless, and that the animals have died from some other cause. Reference was also made in the discussion on this paper to different species of *Kalmia* and other plants, which are reputed to be poisonous to animals, but of whose deleterious effects satisfactory evidence has not been produced.

Subsequently a resolution was passed earnestly recommending to the legislatures of Kansas and other States in which the loco-weed grows, that they give Professor Sayre their hearty indorsement for support for the further investigation of the loco poison.

The Section discussed also the measures desirable for securing at some future time a thorough revision of the National Formulary, and arrived at conclusions which were expressed by the Association at its second session. In regard to the selection of the committee for attending to this work, on motion of Professor Remington, the Section requested the President of the Association, to appoint five members from the central portion of the United States, and one member from each State Association to act as a Committee on the National Formulary. Other resolutions were passed requesting the President to appoint a committee to visit the American Medical Association with the view of getting that body to adopt the National Formulary as authority for all unofficial preparations contained therein; also requesting the Permanent Secretary to suggest to each State Pharmaceutical Association the appointment of a committee to bring the same subject before the State Medical Society.

Natural and Artificial Spring Waters was the title of a paper read by Mr. Enno Sander, who spoke also of the attempts made by a New York firm to prevent the manufacture and sale of artificial Carlsbad water and salt. Mr. Hallberg offered a resolution declaring it to be the right and privilege of pharmacists of this country to prepare and sell any preparation for which a formula is contained in the "National Formulary."¹ The expediency of passing such a resolution was questioned by Messrs. Sayre and Remington, and it was finally withdrawn.

Phosphomolybdic Acid for the quantitative estimation of alkaloids.—Mr. H. W. Snow reviewed the work done by others, and after himself going, experimen-

¹ This refers more particularly to formulas 822 and 828 for *Sal Carolinum factitium* and *Sal Carol. fact. effervescens*.—Editor.

tally, over the ground, concludes that *aconitine*, *emetine*, *strychnine*, and to a certain degree also *hydrastine*, may be estimated with a fair degree of precision and ease by Mayc's reagent, and that no advantage would probably be gained by changing to phosphomolybdic acid; on the other hand, *atropine*, *cocaine*, *gelsemine*, *physostigmine*, *pilocarpine*, and to a lesser extent *coniine*, seem to offer greater encouragement, though in varying degrees, according to the means at hand for estimating them, or the immediate object of the estimation.

Comparative Pepsin testing was discussed by Mr. F. A. Thompson, comparing the requirements of the U. S., British and German Pharmacopœias. A modification of the U. S. process is suggested, reducing HCl from 0.47 to 0.30 per cent. by weight, using the albumen after passing through a No. 30 brass sieve, digesting for 6 hours at 104° F, and during that time stirring constantly and uniformly. Instead of employing an excess of albumen and weighing that not dissolved during the process, it is proposed that the requirements should be that, under the conditions named, a definite amount of albumen used in the experiment should be completely dissolved. Considerable discussion followed the reading of this paper in regard to the strength of acid used, the temperature of digestion, the presence of peptone, the processes of manufacture and the use of antiseptics in the process.

Morphimetric Assay of Opium was discussed in a paper by Mr. J. F. Geisler. The principal modifications suggested for the U. S. P. process are the reduction of lime from 3 to 1.5 gm., of chloride of ammonium from 3 to 0.8 gm., and of alcohol from 5 to 3 cc. These modifications increase the amount of pure morphine obtained, by lessening the loss from its solubility in the mother liquors.

Sponges was the title of a paper by Dr. Rosa Upson, in which their growth, collection, preparation for the market, and uses were briefly described.

A Still for Volatile Oils was described by Mr. A. M. Todd, who exhibited also a model for such an apparatus. Stills and condensers, and the conditions for distilling and condensing properly, were discussed, and in reply to a question, Prof. Prescott stated that in many of the charcoal furnaces in Michigan provision was made for the condensation of vapors which in other localities were allowed to escape, and that large quantities of *wood alcohol* were thus obtained.

Assays of powdered ipecacuanha, by John E. Pennington, had been made according to the process described by Dr. A. B. Lyons (see AMER. JOUR. PHAR., 1885, p. 538); the 15 samples examined yielded results indicating between 1.04 and 1.46 per cent. of emetine.

Mercurous iodide has been prepared in the pure state by E. Sœtje, who states in his paper that careful attention to the details is necessary to obtain it by double decomposition. Prof. A. B. Stevens stated that with solutions of certain strength the iodide will be green, while under altered circumstances it will be yellow.

Arsenic in medicinal bismuth salts was determined by R. E. Hawkes by weighing the mirror of the metal obtained under Marsh's plan, as used by Gautier, and improved by Chittenden. Of seven samples of *bismuth subcarbonate* one was free from arsenic, one yielded a mere trace, and the others .0026, .0080, .0106, .0133 and .0660 per cent. One sample of *bismuth subnitrate* was free, and another contained a trace of arsenic; five other samples yielded .0026, .0053, .0133 and .0133 per cent.

Limit tests for calcium tartrate in cream of tartar was the title of the last paper by C. W. Boetcher, read by Prof. Stevens. The object was to ascertain the correctness of the pharmacopœial test, and its adaptation to the detection of smaller percentages of the impurity by changing the proportion of water for dilution; the results were as follows:

No.	Dilution.	Per cent. Calcium Tartrate.	Time of Cloudiness.	Distinct Turbidity.
1	100 cc.	2	$\frac{1}{2}$ minute.	1 minute.
"	150 cc.	2	$\frac{3}{4}$ minutes.	4 minutes.
"	200 cc.	2	None in 5 minutes.	
2	200 cc.	4	$\frac{3}{4}$ minute.	$1\frac{1}{2}$ minutes.
"	300 cc.	4	$1\frac{1}{4}$ minutes.	2 minutes.
"	400 cc.	4	None in 8 minutes.	
3	500 cc.	6	1 minute.	$1\frac{1}{2}$ minutes.
"	600 cc.	6	$1\frac{1}{2}$ minutes.	2 minutes.
"	700 cc.	6	$2\frac{1}{2}$ minutes.	3-5 minutes.
4	600 cc.	8	$\frac{3}{4}$ minute.	$1\frac{1}{2}$ minutes.
"	700 cc.	8	$1\frac{1}{2}$ minutes.	2 minutes.
"	800 cc.	8	2 minutes.	3 minutes.
5	700 cc.	10	$\frac{1}{2}$ minute.	1 minute.
"	800 cc.	10	1 minute.	2 minutes.
"	1000 cc.	10	$1\frac{1}{2}$ minutes.	$2\frac{1}{2}$ minutes.

Professor Prescott stated that Mr. Boetcher had also examined a large number of samples of cream of tartar procured from drug stores, nearly all of which answered to the pharmacopœial tests, a few only containing about 8 per cent of calcium tartrate; but the cream of tartar procured from groceries was very badly adulterated with terra alba, alum and other substances, only about 40 per cent. of these samples being found of tolerably good quality.

Dr. S. S. Garrigue, on being invited, spoke of the *salt industry* of Michigan, with which he had been connected for many years; and especially referred to a very simple method, introduced by him many years ago, for removing the deliquescent admixtures with which table salt is often contaminated by washing them out by means of a saturated solution of sodium chloride.

The report of the committee on prize essays for the past year not having come to hand, it was ordered to be referred to Council in case it should be received after adjournment.

The new officers were then installed, and the Section adjourned.

Section on Pharmaceutical Education.—Professor Judge presided, and Professor Whelpley acted as secretary. Short papers on this subject by Dr. Eccles, Prof. Sayre and Prof. Bastin were read. The first paper referred chiefly to the objects and methods of education in general, while Prof. Sayre treated of the importance of a good English education as a part of pharmaceutical education. Prof. Bastin's paper dwelled upon education before entering college, upon methods of instruction, upon the necessity of increased laboratory work, and upon the desirability of lengthening the courses in pharmaceutical colleges to two terms, of forty weeks each. The discussions touched upon different problems, and the system of memorizing, followed in many public schools and in some colleges, was branded as the bane of education. On the question of

preliminary training a resolution was passed that a committee of three be appointed to determine a standard of the preliminary examination to be recommended to colleges of pharmacy.

The officers of the Section, constituting the Committee on Pharmaceutical Education for the ensuing year, are Prof. Bedford, New York, chairman; Prof. Sayre, Kansas, secretary, and Prof. Patch, Massachusetts. The Section then adjourned.

The Section on Pharmaceutical Legislation was called to order by Secretary De Forest, and in the absence of the chairman, the President of the Association, Mr. Alexander, was invited to the chair. There being no report from the chairman of the Section, Mr. C. W. Day, chairman of the special Committee on Interchange of Certificates of Pharmacy Boards, reported verbally that the matter had been laid before the different boards, but had met with so little favor that it would probably be better to further discuss it before outlining a plan. The boards in favor of the proposition appeared to be Nebraska, Georgia, District of Columbia, Wisconsin, Minnesota, Pennsylvania and Kings County, New York. Opposed to the proposition were Wyoming, New Jersey and New York State. Ohio, Massachusetts and Iowa claimed to have no power in the premises, and New Hampshire, Missouri and Virginia were not prepared to take action. From about one-half of the States no reply had been received. After some discussion a resolution was passed that the chair appoint a committee of five to draw up a general outline plan for the interchange of certificates of the different boards of pharmacy.

After a recess, Mr. A. E. Ebert presided, when Mr. C. W. Day, Illinois, was elected chairman; J. N. Hurty, Indiana, secretary, and Rob J. Brown, Kansas, associate, Committee on Legislation for the ensuing year.

A resolution was passed that in the future the Legislative Section should not meet simultaneously with another Section. Also, one urging upon State Pharmaceutical Associations the necessity of exercising great care in selecting competent and educated pharmacists for the State Board of Pharmacy.

After installing the officers the Section adjourned.

The Ninth Session of the Association, the final one of the meeting, was held Friday morning, September 7, when, after the reading of the minutes, and the proposition of new members, the officers elected for the ensuing year were installed.

The Committee on the President's Address presented a brief report, stating that they had found it impossible to carefully consider the suggestions made by the President; but that prompt attention should be given to the 25th suggestion, and that the twenty-second, referring to a new line of preparations, be referred to the Committee on the revision of the Pharmacopoeia. Regarding the other suggestions the Committee requested the privilege to report to the Council. These propositions were adopted.

Mr. Finlay moved a reconsideration of the vote by which San Francisco was selected as the place for the next meeting. The motion to reconsider was lost by a vote of 30 yeas to 34 nays.

On motion of Prof. Bedford, the Permanent Secretary was empowered to arrange the schedule naming the dates and hours at which the sessions of the Sections shall be held at the next meeting.

Prof. E. W. Runyon was elected Local Secretary for next year.

The following Committees were appointed by the President :

Committee on National Formulary : C. L. Diehl, C. S. N. Hallberg, L. Eliel, C. T. P. Fennel and A. Conrath.

Committee on Revision of the Pharmacopœia : L. C. Hopp in place of A. B. Lyons, removed to Honolulu.

Committee on Arrangements : E. Painter, K. Simmons, T. N. Jamieson, R. J. Brown and E. Sander.

Committee to visit the American Medical Association : Prof. Remington, K. Simmons, C. A. Heinitch (two more members to be appointed).

The Section on Commercial Interests presented the report of the Committee on Exhibits, recommending that the prize for "the best general exhibit" be awarded to Hance Bros. & White, of Philadelphia, and the prize for the "best exhibit of pharmaceuticals made by a pharmacist in his own shop" to Feldkamp & Hallberg, of Chicago. The recommendations were adopted.

After passing the customary votes of thanks the Association adjourned to meet next year in San Francisco at a time to be designated by the Committee on Arrangements.

THE BRITISH PHARMACEUTICAL CONFERENCE.

After an interval of twenty-four years the British Pharmaceutical Conference has revisited Bath. Although this city was not, strictly speaking, the birth-place of the association, for that name applies more correctly to Newcastle-on-Tyne, which is to be visited next year, Bath is the place in which the Conference first met as an organization, in 1864, since which time its roll of membership has increased from one hundred to nearly two thousand names. Such a result, besides being evidence of the fitness of the association for survival, bears unmistakable testimony to the wisdom and energy with which its business has been conducted during the interval, no small portion of the credit for which is due to Mr. F. Baden Benger, who for so many years performed the duties of one of its Honorary Secretaries. It was therefore only natural that on the occasion of Mr. Benger assuming the presidential chair the members should have rallied heartily to his support and secured the success of the meeting. Following the practice of the two previous years, the initial gathering of the members of the Conference took the form of a *Conversazione*, which was held at the Grand Hotel on Monday evening, September 3d. This gathering was marked by the attendance of representative pharmacists from all parts of the country, including several of the President's former colleagues on the Board of Examiners.

On Tuesday morning, at ten o'clock, the Conference met for business in the large room at the Grand Hotel. As a preliminary the members had the pleasure of listening to some hearty words of welcome from the Mayor of the city, who expressed his regret that his duties would prevent him from attending the meetings of the Conference or accompanying the members on their excursion to Tintern Abbey. The President gracefully acknowledged this "official" recognition of the Conference, and after the receipt of several letters of regret at inability to attend from a number of old friends of the body had been announced, and a list of delegates appointed to attend the Conference by various

Associations read, the President called upon Mr. Naylor, one of the Honorary Secretaries, for the report of the Executive Committee.

If it be true that a social body is happy in proportion as it remains without a history, the British Pharmaceutical Conference might be considered thrice blessed, since its history, as recorded in the annual reports, has been usually of the briefest and most uneventful nature. From this rule the report presented by the Executive Committee to the Conference showed no variation. The only subject of an "exceptional" character reported upon was a proposition that members attending the Conference should be furnished with copies of the papers to be read, which the Executive has decided to be impracticable, principally, as it appears, for financial reasons. Other subjects referred to in the report are certain changes of colonial secretaries, the issue of a new edition of the Unofficial Formulary, and grants in aid of research. In connection with the gift of books provided by the Bell and Hills Fund a difficulty has arisen similar to that which occurred at Southport, consequent upon there being no local pharmaceutical association in existence in Bath to receive the books. They have therefore been presented to the Bath Royal Literary and Scientific Society, subject to the condition that they shall at all reasonable times be accessible to resident pharmacists.

It is somewhat difficult to gather from the Financial Statement the exact relative financial position of the Conference as compared with last year; but taking into account only the money assets and liabilities, and ignoring any increase in the stock that may have accrued, there seems to have been a decrease on the credit side of about £27. This would be more than accounted for by the falling off in members' subscriptions received, from £611 13s. 9d. to £584 13s. 6d. On the other hand the effect of this falling off has been lessened by a reduction in the cost of the production of the 'Year Book,' postage, and in other items. The publication of the Unofficial Formulary has also been a source of profit to the Conference. But it is evident the membership is now hardly large enough to provide the means for the present rate of expenditure, and it behooves all those who wish to maintain the Conference in a vigorous condition to do what they can to recover the ground that has been lost during the last two or three years in respect to its numerical strength. The adoption of the Report of the Executive Committee and of the Financial Statement was moved by the President, seconded by Mr. G. S. Taylor, and carried unanimously.

The President then proceeded to deliver what proved to be a very long, but very interesting address. He commenced by humorously describing the meeting as the celebration of "the silver wedding of pharmacy and good fellowship," and after an appropriate eulogium of the late Henry Deane, the first President of the Conference, he referred briefly to the growth of the Conference and some other changes during the twenty-five years that have passed since its formation. The average annual death-rate, he said, had fallen considerably, a fact which pharmacists as scientific men could understand even if the credit for it was mainly due to others. But in the lightening of the "burden of pain" which had taken place during the same time, it was claimed that pharmacists have played an important, if sometimes an unrecognized part. The speaker then proceeded to consider the relation of pharmacy to the pharmacist who has adopted the calling as a means of living. It was pointed out that formerly pharmacy was combined with a trade in the preparation and supply of a large

number of sundries which has in recent years been diverted to a large extent into other channels, with a corresponding diminution in the pharmacist's means of living. In discussing the question how the loss was to be made good, Mr. Bengier uttered some well-merited strictures upon the growing tendency among medical men to delegate their prescribing to manufacturers, and spoke of it as a reproach to pharmacy that so many of the preparations dispensed by medical men, and even prescribed by physicians, or purchased and used by the public on their own responsibility, should be manufactured by persons who possess no legal qualification to practise pharmacy in this country. In fact, he is of opinion that the wholesale manufacturer of medicines should possess the same legal qualifications as the retail pharmacist. Notwithstanding, however, the severe competition, Mr. Bengier believes there is remunerative work to be found by the skilled pharmacist who looks for it in the right direction. This would seem, in his opinion, to lie in the tendency to differentiation in pharmaceutical production. "No man will produce all the preparations he uses or sells, but he may make most of them, and it is open to him to endeavor to make a special reputation for some. If he can succeed in doing anything better than it has been done before he will find no difficulty in obtaining better payment for his work." This argument was the more forcible, since the speaker himself is a notable illustration of the truth of it. The success or failure of the pharmacist of the future will, in Mr. Bengier's opinion, largely depend on his fitness to accommodate himself to altered and modified conditions,—among which will be a diminished demand for his services as a mere distributor of medicines,—and his own recognition of the fact that outside pharmacy proper, but nevertheless allied to it, are fields for skill, industry, and enterprise in which his technical and scientific knowledge may be profitably utilized. All this led up naturally to a consideration of the important subject of the nature of the early training which shall best equip the pharmacist as a scientific man. In order to throw light upon this Mr. Bengier has been in communication with various eminent men as to the conditions of pharmaceutical apprenticeship or pupilage and of the subsequent or qualifying examinations in other countries. In this way he has become possessed of a mass of information upon these points from France, Germany, Austria, Belgium, Italy, Switzerland, Russia, Sweden, Denmark, Holland, the United States, Canada and Australia. One thing that must have struck those who heard the *précis* of this information laid before the Conference, and will strike all those who read it for themselves, is the almost unbroken uniformity with which in nearly every country evidence is required of an advanced scholastic education as a preliminary to a pharmaceutical career, as well as subsequent systematic training of the pupil in the sciences upon which his calling is based. Those who have objected to the minute dose of curriculum which it is proposed to administer in this country will find no support in these reports from the experts in the countries mentioned, where the consensus of practice, at least, is in its favor. After pointing out the inferences to be drawn from these reports, Mr. Bengier concluded by urging on all entering the pharmaceutical ranks that they should regard scientific education, not as a troublesome impediment placed in their way by a reckless Parliament, prompted by a pedantic society, but as the very key to future success. The address was listened to with interest throughout, and the ripples of laughter that followed the utterance of the quiet

bits of humor that occur in it here and there proved that the audience was in continued sympathy with the speaker. At its close, upon the motion of Mr. S. R. Atkins, seconded by Mr. Bottle, Vice-President of the Pharmaceutical Society, and supported by Mr. Martin, the Conference awarded to Mr. Bengier an enthusiastic vote of thanks.

The President mentioned that the American Pharmaceutical Association was simultaneously in session in the city of Detroit, and suggested that the officers of the Conference should be authorized to send to it by cable a fraternal greeting. The suggestion was heartily adopted.

Report of Formulary Committee.—The Conference then proceeded to the reading and discussion of reports and papers, the first taken being the report of the Unofficial Formulary Committee, which was read by the Chairman, Mr. Martindale. This report enumerated briefly the new and modified formulæ that appeared in the proof copies of the edition of the Formulary of 1888, as submitted to the Conference by the Committee. The majority of these formulæ are new. They include a vinegar of ipecacuanha and a syrup made from it; an elixir and a compound tincture of phosphorus; an elixir of saccharin; a liquid extract of tritium; syrups of codeine, bromide of iron, hydrobromates of iron and quinine, hydrobromates of iron, quinine and strychnine, and wild cherry; tinctures of marigold flowers and euonymus, and a stronger tincture of capsicum, and an ointment of the oleoresin of capsicum. Emulsion of cod liver oil is the subject of an improved formula, in which the yolk of egg is introduced to assist the emulsification. The preparation of tincture of quillaia is incorporated with the preparation of the solution of coal tar, for which it is required. Lastly, there is a formula for a "stronger solution of hypophosphite of iron," which has involved corresponding modifications in the formulæ for the hypophosphite preparations. The adoption of this report and the authorization of the issue of a new edition of the Formulary was moved by the President, who referred to the fact that 2250 copies of the first edition had been sold, and that it had been a source of income to the Conference; the motion was seconded by Mr. Robinson in very complimentary terms and agreed to unanimously. This was followed by a well-earned vote of thanks to the Unofficial Formulary Committee, and especially to the Chairman, Mr. Martindale, and the Secretary, Mr. Naylor, which was heartily accorded on the motion of Mr. Plowman, seconded by Mr. A. H. Mason.

Aconite.—Mr. E. M. Holmes then presented a report on the progress made in the experiment he had undertaken to carry out for the Conference in the cultivation of a definite form of *Aconitum Napellus*, with a view to furnishing suitable material for a more trustworthy chemical investigation of the root than has hitherto been possible. He described three forms that he has selected—from Colchester, St. Neot's, and Riverhead—as approximating in his opinion to typical plants, and recounted the observations made during the cultivation of specimens in his own garden. Some rough experiments, in which the relative activity of the plants was estimated by the intensity of the numbing sensation produced upon the tongue on chewing the seeds, seemed to indicate the desirability that a separate chemical examination of each form should be made. Some interesting information was also given as to the probable yield of root, and the best method of propagation under the conditions of cultivation. The report gave rise to an interesting discussion, in which Professor Hillhouse and

Messrs. Groves, Ransom, Plowman and Greenish took part, at the conclusion of which a unanimous vote of thanks was accorded to Mr. Holmes.

Morphine Derivatives.—After an interval of luncheon, which was served in the Guildhall, a report was presented by Messrs. Dott and Stockman on the Chemistry and Pharmacology of some Morphine Derivatives, which was a continuation of one presented to the Conference last year. The first paragraph discussed the composition of the compound that was obtained in the artificial production of codeine from morphine, and was first described as dimethylmorphine, the correctness of which name is disputed. Apart from chemical considerations the authors consider that its physiological action is so different from that of methylmorphine or codeine, as to render the constitution represented by that name improbable, and the authors appear to look upon it as methocodeine. They also refer to certain acetyl and benzoyl derivatives, methyl-sulphuric-acid-ether and chlorocodide. The topics of the report were necessarily somewhat recondite, but testimony to the value of the research as helping to place medicine on a scientific basis was borne by Dr. Thresh and Mr. Plowman. Incidentally Dr. Dott remarked that the opium alkaloids do not differ from one another in their physiological action so much as is generally supposed, but might be said to form groups differing rather in the intensity than in the quality of their action.

Extraction by Pressure—the paper next read—was a plea by Dr. Symes for depending rather upon the operation of pressing than on that of percolation in the extraction of certain drugs. Restoration of moisture to the dry drug, and subsequent expression, Dr. Symes considers to be the treatment specially adapted to leaves—of which senna is a type—where there is a bulky material and a danger of injuring the active principle if percolation and evaporation be adopted. The plan recommended for senna is to digest the leaves for from four to six hours in a covered vessel with a mixture of equal parts of rectified spirit and water, in the proportion of a pound of leaves to sixteen fluidounces of menstruum; afterwards to put the mixture into bags and subject it to pressure of fifty tons or more until it ceases to yield liquid. The marc is then broken up, water added, and pressure again applied, until the product amounts to sixteen fluidounces for each pound of leaves used. In this way, according to Dr. Symes, a very active preparation can be obtained, and *Convallaria Majalis*, *Damiana* and *Hamamelis* are instanced as suited for treatment upon the same principle. Dr. Symes's experience in the treatment of senna by pressure rather than by percolation was practically confirmed by Mr. T. B. Groves and Mr. Conroy, but on the other hand other speakers had more faith in percolation and evaporation at a low temperature.

Oil of Cajeput.—In the next paper read, Mr. West, lecturer on Botany and Materia Medica at the Bradford Technical College, reported the results obtained in the examination of fourteen samples of commercial oil of cajeput. The color of these samples ranged from "pale bluish green," which is the character given in the British Pharmacopœia, to "full bluish green;" the specific gravity at 15.5° C. from 0.9226 to 0.9240; and the boiling point from 174° to 174.5° C. No difference in odor could be detected between the samples, even on boiling. It would therefore appear that the article at present supplied as cajeput oil is fairly uniform in character. Copper was found in every sample, which agrees with Mr. Histed's experience in 1872 (*Pharm. Jour.* [3],

ii. 804). Another sample that had been kept in stock for a long time was pale brown, and the specific gravity only 0.9194. Guibourt says that an oil distilled by himself from *Melaleuca* leaves had a fine green color; but Histed says that ordinary cajepout oil after being redistilled is white, though it becomes again green if placed in contact with copper turnings. Mr. West incidentally called attention to the fact that for histological purposes this oil is to be preferred to oil of cloves in transferring sections from alcohol to Canada turpentine, as it penetrates more quickly than oil of cloves, and is expelled more readily from the turpentine afterwards.

Cotton-Seed Oil in Lard.—The practice of adulterating lard with cotton-seed oil, which appears to have developed recently in the United States to an enormous extent, has rendered very desirable the publication of a good test for the detection of the fraud. In the next paper read, on "Lard: its Adulteration with Cotton-Seed Oil and Detection thereof," Mr. Conroy gave the results of his experiments in this direction. The nitric acid test proposed some years since by Mr. Conroy for the detection of cotton-seed oil in olive oil proved not quite satisfactory when applied to lard, and he prefers a modification of Milliau's test, dependent upon the reduction of silver nitrate. This consists in adding twenty grain measures of a test solution, containing five parts of silver nitrate and one part of nitric acid (sp. gr. 1.42) in one hundred parts of rectified spirit, to about one hundred grains of the lard previously melted at a water-bath temperature in a test-tube and keeping the mixture in boiling water for five minutes. Pure lard remains perfectly white, but if adulterated with cotton-seed oil the lard assumes a more or less olive-brown color according to the amount of the adulterant present, 1 per cent. causing a distinctly perceptible change. The reading of this paper was followed by an animated discussion, in the course of which Mr. W. Thompson expressed an opinion that whilst freedom from blackening might be accepted as evidence of the absence of cotton-seed oil from a sample of lard, the reduction of silver nitrate was not necessarily evidence of its presence.

This brought the business of Tuesday to an end, and many of the members availed themselves of opportunities afforded them by the courtesy of the authorities for visiting the Abbey Church and the Grand Pump Room and Baths.

Insect Powder.—The business of the Conference on Wednesday morning commenced with the reading of a paper by Mr. John Kirkby, on Insect Powder. With a view to the detection of the introduction of foreign substances into insect powder the author has submitted the flower heads of authentic specimens of *Chrysanthemum cinerariæfolium*, the reputed source of Dalmatian insect powder, to a microscopical examination with a view to the detection of histological elements characteristic of the species. These he believes he has found in the pollen grains and the epidermal papillæ of the ligulate florets, of which drawings were shown. The papillæ differ somewhat even from those of the ligulate florets of *C. roseum*, the source of Persian insect powder, and could be used as a means of detecting that admixture. The paper gave rise to a lively discussion, and the necessity for some test for the determination of the purity of this article was evidenced by a statement by Mr. Conroy to the effect that reputed Dalmatian insect powder may be bought at a much lower price per pound than the flowers from which it is supposed to be ground. Mr. Conroy also pointed out

that the activity of a sample of insect powder could be readily tested by trying it directly on flies.

Cassia Tora.—The results of a "Proximate Analysis of the Seeds of *Cassia Tora*," by Mr. W. Elborne, formed the subject of the next paper. These seeds and the leaves of the same plant are used in India as a remedy for ring-worm and other skin diseases, and Dr. Dymock has suggested that they may contain chrysophanic acid. In Mr. Elborne's opinion their medicinal activity is due to a substance which he describes as resembling emodin. From the alcoholic extract he states that he obtained a glucoside, which he calls "potential emodin;" but this view is rather conjectural than the result of satisfactory experiment, and, as pointed out by Mr. Naylor, the subject requires further investigation.

The Solubility of Citrate of Caffeine was the subject of a paper read by Mr. Gerrard, in which he criticised the official description of the drug in the British Pharmacopœia. Having endeavored to make a ten per cent. solution for convenience in dispensing, he found that out of five samples purchased not one was sufficiently soluble, and none of them corresponded to the official statement that the preparation should form a syrupy solution with a little water. Using a sample prepared by himself Mr. Gerrard met with the same difficulty. His experiments led him to the conclusion that citrate of caffeine has a mean solubility of about 1 in 30. He is therefore of opinion that the statement in the British Pharmacopœia is a mistake that has also found its way into other works.

Caffeine.—In the succeeding paper, by Mr. J. Moss, an instance was given in which an article represented to be "Citrate of Caffeine, Old P.B.," consisted simply of caffeine, without a trace of citric acid. No explanation could be obtained of the designation, and evidently in dispensing such an article as citrate of caffeine, as nearly as possible twice the dose of caffeine intended would be given.

Laboratory Notes, by Mr. R. Wright. The first note was on *Acetum Ipecacuanhæ*, and described, apparently, the work that led up to the formula adopted by the Unofficial Formulary Committee. The second was on Liquid Extract of Cascara. In the endeavor to prepare a tasteless extract, it was found that when lime was used a pale colored extract was produced apparently destitute of any laxative property. But when a mixture of the bark with magnesia was extracted with dilute alcohol, the preparation obtained was free from bitterness, and appeared to act as powerfully as the bitter extract. The next note was on Syrupus Ferri Phosphatis, and described a process for the preparation of an improved syrup containing a smaller proportion of acid and at the same time admitting of dilution without deposit of phosphate. For that purpose, the author recommends to dissolve 360 grains of iron wire in 6 fluidounces of syrupy phosphoric acid, sp. gr. 1.50, and 9 ounces of distilled water, filtering the solution into 72 fluidounces of simple syrup and adding water to make up 96 fluidounces. The last note, on Unguentum Hydrargyri Oxidi Flava, described the results of experiments made to supply the want of an authoritative formula. The B. P. formula for Unguentum Hydrargyri Oxidi Rubri did not give the author a satisfactory product. By melting yellow wax with soft paraffin in the proportion 1 to from 7 to 16 according to the prevailing temperature, a satisfactory ointment may be obtained. The discussion following the reading of this paper turned principally upon the efficacy of the "tasteless" cascara extract, and dis-

closed the existence of a wide difference of opinion as to the result of treatment of the extract for the removal of bitterness.

Compound Syrup of Hypophosphites.—The next paper, by Messrs. Dott and Inglis Clark, gave the results of the examination of four samples, three obtained from commercial sources and one prepared by themselves. Sensible deficiencies in some or all of the constituents were ascertained, justifying the suspicion that this preparation does not always contain all that is represented upon the label.

Oil of Meniha arvensis.—The object of the next paper, by Mr. J. Moss, was to place on record certain characters of oil of *Meniha arvensis* distilled from plants grown in England by himself. The oil was found to have a decidedly yellow color; the specific gravity at 62° F. was 0.9107; it commenced to boil at 339° F., the temperature rising 402° F. The specific gravity of the redistilled oil was 0.9117.

Cephaelis Tomentosa.—Mr. Ransom then read a note on the examination of the root and stem of *Cephaelis tomentosa*, said to be used in Trinidad for the same purposes as the root of *C. Ipecacuanha*, though the root is totally unlike that drug both in external appearance and internal structure. The presence was ascertained of traces of an alkaloid which gave a reaction with mercuric chloride, resembling that of emetine. But as the physiological action of sixty grains of the root was inappreciable, the amount of alkaloid present must be very small.

Citrate of Iron and Quinine.—A paper by Mr. R. H. Davies, gave the result of twenty-one experiments undertaken to ascertain the amount and precise nature of the alkaloid present in commercial samples of this preparation. The total alkaloid varied from 11.42 to 19 per cent. Upon the basis of the precipitated tartrates obtained it was inferred that some of these samples contained considerable quantities of amorphous alkaloid, and these were cases in which the preparation had been obtained from foreign sources. In reference to the Pharmacopœia formula, Mr. Davies suggests that the most important conclusion to be drawn from his work is that a preparation containing 16 per cent. of alkaloid cannot be obtained as directed. That point, however, had already been settled by Mr. Fletcher, and it would appear that Mr. Davies is unaware of the fact that the requirement of the British Pharmacopœia has been reduced to 15 per cent. The Conference then adjourned to luncheon, which was again served in the Banqueting Room at the Guildhall.

Size of Pills.—In the next paper, Mr. N. Asten brought under the notice of the Conference the question recently broached in these columns as to the size of pills containing very small quantities of active medicines, and suggested the desirability of adopting a uniform standard for the sake of obviating inconveniences that now result from such pills being made of different sizes by different dispensers. In the discussion that followed, reference was chiefly made to the weight of the pill, although it is evident that the uniformity to be secured for the satisfaction of patients would apply rather to the size than to the weight. Although no definite decision was arrived at, the preponderance of opinion appeared to be in favor of a minimum size, when possible, of one grain.

Carthagen Bark.—The next paper was by Mr. Hooper, and consisted of a summary of the history of Carthagen bark and of the experiments connected with the introduction of Carthagen bark trees into the Nilghiri Cinchona

Plantations of the Madras Presidency. The result of the experiments has been to show that the bark from the plants now being cultivated in the Nilgiris as yielding Carthagena bark is commercially valueless, stem-bark examined from two trees, one five and a half and the other six years old, yielding no quinine and the root-bark only 1.1 per cent.

Hybridization of Cinchonas.—This paper by Mr. D. Hooper, forms an important contribution to the knowledge of the conditions affecting the cultivation of cinchona, and is of a class that can only be contributed by an investigator holding an exceptional position like the Government Quinologist. In the cinchona plantations of the Madras Government there are two well defined species of *Cinchona*—*C. succirubra* and *C. officinalis*—the bark from the former containing less quinine with more cinchonidine and cinchonine than that from the latter. Between these two species there are also many hybrids, and as the hybrids frequently assume the quicker growing character of the *succirubra* parent it was interesting to ascertain how far and in what direction the hybridization affected the production of alkaloid. Fifty samples of *succirubra* bark examined yielded an average of 6.5 per cent. of total alkaloid, and in 100 parts of this the quinine ranged from 17.6 to 26.8 parts, the average being 22.2 parts, whilst the average of the cinchonidine was 36.1 parts. Only five out of the fifty samples failed to comply with the requirements of the British Pharmacopœia for an official bark that it should yield between 5 and 6 per cent. of total alkaloid, not less than half of which shall consist of quinine and cinchonidine. From fifty samples of *C. officinalis* bark the average yield of total alkaloid was 5.25 per cent., but in 100 parts of this the quinine ranged from 48.2 to 62.1 parts, average 55.9 parts, while the cinchonidine only averaged 26.7 parts. The results obtained in analyses of twenty-five hybrid barks showed more total alkaloid with proportions somewhat different from the theoretical quantities calculated for a typical hybrid on the assumption that it would partake equally of the character of the two parents. The quinine ranged from 30.8 to 55.3 per cent. of the total alkaloid, the figures for cinchonidine increasing more or less with the decrease of the quinine, and the two together constituting four-fifths of the whole alkaloid. The highest amount of quinine in the *succirubra* barks was only equal to the lowest in the hybrid barks, whilst that of the highest of the hybrids merged into the lowest of the official barks.

This brought the reading of papers to an end, and the next business was the presentation of books provided by the Bell and Hills Fund. In accordance with what has been already mentioned, in the absence of a local association the books were presented to the Bath Royal Literary and Scientific Society, and they were accepted with a hearty acknowledgment by the President of that institution, Mr. Murch, who curiously enough filled the office of Mayor of the city at the time of the previous visit of the Conference in 1864.

An invitation was then given to the Conference by Mr. Martin and Mr. Clague, speaking in the name of the pharmacists of Newcastle-on-Tyne and district, to visit that city next year. The deputation drew a glowing picture of the allurements presented by the Tyne district, and upon the motion of Dr. Thresh, seconded by Mr. Woolley, the invitation was cordially accepted.

The Unofficial Formulary Committee was then reappointed, on the motion of the President, seconded by Mr. Conroy, and authority was given to the Com-

mittee in cases of emergency to publish formulæ provisionally, provided that they were approved of by seven of its members, each formulæ being subject to revision before formal publication.

The Conference then proceeded to the choice of officers for the ensuing year, and on the recommendation of the Executive the following were unanimously elected :

President—C. Umney.

Vice-Presidents—M. Carteighe, S. Plowman, C. Symes and N. H. Martin.

Treasurer—W. Martindale.

Honorary General Secretaries—J. C. Thresh and W. A. H. Naylor.

Other Members of the Executive Committee—J. E. Bruncker, M. Conroy, R. H. Davies, D. B. Dott, A. W. Gerrard, J. Harrison, T. Maben, B. S. Proctor and F. Ransom.

Local Secretary—T. M. Clague.

Auditors - J. Wilson and T. Rheeder.

Votes of thanks were then heartily accorded to Mr. H. Hutton, of Bath, who had so ably performed the duties of Local Secretary ; to the Mayor and Corporation of Bath, for having lent the Banqueting Hall of the Guildhall for luncheons ; to the Royal Literary and Scientific Society, for having opened its rooms to the members during their stay ; and to Mr. Radway for the use of the assembly room at the Grand Pump Room Hotel for the meetings of the Conference. Last, but not least, an enthusiastic vote of thanks was passed to Mr. F. B. Bengier for the able and courteous way in which he had filled the office of President. In acknowledging this compliment, Mr. Bengier said that it was probable that one of the results of the visit of the Conference to Bath would be the resuscitation of the local pharmaceutical association, towards which Mr. S. R. Atkins had promised to assist by the delivery of an address. And thus finished a meeting of the Conference, which if not so largely attended, was equal in other respects to the most successful of its predecessors.

On Thursday morning the weather seemed to offer little prospect of an enjoyable excursion, but by the time fixed for starting the rain had ceased, and under a bright sky a large number of members and ladies gathered at the railway station whence they were conveyed by a special train to Chepstow. On their arrival the Castle was visited under the guidance of Mr. C. H. Clarke, who had undertaken to give assistance in that way. At one o'clock the party adjourned to luncheon at the "Beaufort Arms Hotel ;" the chair was taken by the President, and before leaving the table he proposed the health of Mr. Hutton as a recognition of the great services he had rendered in making arrangements for the excursion, as well as in carrying out the other work devolving upon him as Honorary Local Secretary. The drive to Tintern Abbey and the passage of the Wyndcliffe were much enjoyed, and the return journey was made by special train, which brought the party back to Bath almost exactly at the hour which had been fixed.—*Pharm. Jour. and Trans.*, September 8.

Methylal has been used hypodermically in doses of 0.03 to 0.12 gm., by Dr. Krafft (*Ther. Monatsh.*), in asthenic cases of alcoholism ; the results were satisfactory (see also *AM. JOUR. PHAR.*, 1887, p. 198).

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

We acknowledge the reception of the following pamphlets, containing essays and theses by French pharmacists. All were published in Montpellier, except where otherwise noted.

Contribution à la Photométrie scolaire. Par Albert Cure. Paris: J. B. Ballière & Fils. Pp. 47 and 3 plates.

A contribution to the photometry of schools.

De l'Aluminium et de ses Sels. Par E. Causse. Pp. 64.

On aluminium and its salts.

Étude sur les Eaux minérales du Cantal. Par E. Védrières. Pp. 62.

Study on the mineral waters of (the department of) Cantal.

Des Antipyrétiques de la série aromatique. Par Henri Provot. Pp. 94.

On the antipyretics of the aromatic series.

Aniline et Fuchsine. Par E. Geoffroy. Pp. 78.

Aniline and fuchsine.

Dosage de l'Urée. Tableau donnant les Coefficients de correction des Volumes gazeux. Par E. F. Geffroy. Pp. 50 and 1 plate.

Estimation of urea; with a table giving the coefficients of correction of the volumes of gases.

Contribution à l'Étude de la Flore et de la Matière Médicale de la Sénégambie. Par Camille Sambuc. Pp. 104.

Contribution to the study of the flora and materia medica of Senegambia.

Les Ménispermées et leurs Produits. Par Auguste Dreuilhe. Pp. 46.

The menispermaceæ and their products.

Étude sur la Recherche des Graines étrangères dans le Blé et ses produits. Par Marc Henon. Pp. 52 and 2 plates.

Study on the recognition of foreign seeds in grain products.

Des Algues pharmaceutiques. Par H. B. Lautié. Pp. 80.

On the pharmaceutic algæ.

Des principaux Camphres d'Origine végétale. Par Lucien Dérue. Pp. 56.

On the principal camphors of vegetable origin.

Volksthümliche Deutsche Arzneimittel-Namen. New York, 1888, pp. 32.

Popular German names of medicaments.

This pamphlet is a reprint from Dr. F. Hoffmann's *Pharmaceutische Rundschau* and may be obtained by applying to Messrs. Lehn & Fink, enclosing a two-cent stamp. The carefully prepared list contains not only those German names which are generally used in pharmaceutical works, but also those which are employed in certain localities only.

Cocaine dosage and cocaine addiction. Cocaine Toxæmia. By J. B. Mattison, M. D., Brooklyn, N. Y. Pp. 44.

Two papers reprinted from the *Lancet* (May 23, 1887), and *La Tribune Médicale* (January, 1888).

The Extra Pharmacopœia with the Additions introduced into the British Pharmacopœia, 1885. By Wm. Martindale, F. C. S., etc. Medical references and a therapeutic index of diseases and symptoms by W. Wynn Westcott, M. B. Lond., etc. Fifth edition. London: H. K. Lewis, 1888. P. 462.

The usefulness of this little work is attested by the fact that five editions became necessary within as many years. In February 1888 we have noticed the fourth edition; the one now before us has been enlarged by 46 pages, chiefly through the introduction of the numerous modern remedies and medicinal substances, like antifebrin, acetophenone, phenacetine, iodol, salol, salufer, saccharin, lanolin, mollin, methylal, etc., etc. This new edition has been very carefully prepared, and being as comprehensive and reliable in the information imparted as its predecessors, will be equally useful.

The Physician's Manual of the National Formulary. Compiled by C. S. Hallberg, editor of the *Western Druggist*, etc. Chicago: Feldkamp & Hallberg. Pp. 47.

It is intended for physicians, to inform them of the strength and applications of the preparations admitted into The National Formulary, this information consisting mainly of the notes contained in the Formulary, together with condensed statements of the ingredients, editorial notes, etc. On page 18 a fluidram of liquor ferri iodidi is stated to contain about 15 grains of ferrous iodide; it should be 45 grains.

Price and Dose Labels of Drugs and Preparations generally kept in a retail pharmacy including, besides those official in the last revision of the U. S. P., many other new and rare drugs and chemicals, with the Latin, French and German synonyms. Edited by Hans M. Wilder. New York: J. H. Vail & Co., 1888.

This is of the same scope as Lochman's "Dose and Price Labels" of which we noticed the second edition in 1887, p. 319. In Mr. Lochman's labels prominence is very properly given to the Latin titles, while in Mr. Wilder's labels the English names have been printed in large and bold type, and the Latin names relegated to a place of secondary importance. The addition of French and German synonyms will prove of great convenience to many. That the information collected together on these labels, including medical properties and doses, is correct and trustworthy, may be taken for granted from the compiler's well known carefulness.

Report on the Experiments made in 1887 in the treatment of the downy mildew and the black-rot of the grapevine; with a chapter on the apparatus for applying remedies for these diseases. Prepared by F. Lamson Scribner, under the direction of the Commissioner of Agriculture. 8vo, pp. 113.

Sugar-producing Plants. Record of Analyses made by authority of the Commissioner of Agriculture, under direction of the Chemist, 1887-88. Sorghum: Fort Scott, Kan.; Rio Grande, N. J.—Sugarcane: Lawrence, La. Together with a study of the data collected on sorghum and sugarcane. 8vo, pp. 132.

The foregoing two pamphlets are issued by the department of agriculture, and are numbered, the former Bulletin, No. 5, Section of Vegetable Pathology, and the latter Bulletin, No. 18, Division of Chemistry.

Science of Photography at home and abroad. Published by Jas. W. Queen & Co., Philadelphia. Price \$1. per year.

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OBITUARY.

Robert Coulton Davis, Ph. G., class 1844, and a member of the Philadelphia College of Pharmacy, died in this city August 24th. His graduation thesis on cantharides was published in this Journal, 1844, page 81. He was in business for many years at 16th and Vine streets.

Dr. James Kemble, Ph. G., class 1861, died in Philadelphia, suddenly, August 3. After carrying on the drug business for a number of years, he studied medicine, and of late years was a homœopathic practitioner.

Harry L. Pfund died at the residence of his parents in Philadelphia, July 19, aged 20 years. He was an apprentice in the store of John A. Martin, Ph. G., and a diligent and attentive student at the College, where he successfully passed a partial senior examination last March.

John C. Savery, Ph. G., class 1851, died suddenly at Winona, Ohio, August 1st, while on a visit to his brother. He left the drug business many years ago for the practice of law, his office having been lately at 781 Walnut street.

Thomas J. Scott, Ph. G., class 1846, died at Lexington, Ky., March 22, aged 59 years. He was formerly in business in Philadelphia, but having a fondness for art he devoted his time during the latter part of his life to painting and became noted particularly as a painter of trotting horses.

Richard Anthony Proctor, well known throughout the civilized world as an astronomer, died in New York City of yellow fever, September 12. The deceased was born in Chelsea, England, March 23, 1837, and at the age of seventeen became a clerk in a London bank, devoting his leisure time to the study of his favorite science, mathematics. Subsequently he attended King's College, London, and St. John's College, Cambridge, and graduated in 1860. Many of his essays and books are strictly scientific, more particularly the earlier ones, like "Double Stars" (1863), "Saturn and its System" (1865), "Gnomonic Star Atlas," and "Handbook of the Stars" (1866); but, in 1870, with his work on "Other Worlds than Ours; the plurality of worlds studied under the light of recent scientific researches," he entered the field of popular science, in which he has been one of the best known authors of popular astronomical works, and of contributions to magazine literature. Mr. Proctor visited the United States in 1873 on a lecture tour, and of late years had an observatory at Oak Lawn, Marion County, Florida, where he spent, with his family, a portion of last summer, arriving in New York September 10, on his way to England. The general fatigue of which he complained rapidly developed into yellow fever; on the night of September 11 he was removed from the Westminster hotel to the Willard Parker Hospital, where he died on the following day.

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Vol. 60

AMERICAN

No. 11

JOURNAL OF PHARMACY.

PUBLISHED BY AUTHORITY OF THE

PHILADELPHIA COLLEGE OF PHARMACY.

Under the supervision of the Publishing Committee, consisting of

HENRY N. RITTENHOUSE, JAMES T. SHINN, CHARLES BULLOCK, T. S. WIGGAND,

AND THE EDITOR

JOHN M. MAISCH.

Price, \$3.00 per Annum, }
in advance.

{ Issued in Monthly numbers of
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Single No. }
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NOVEMBER, 1888. Vol. XVIII., No. 11

CONTENTS.

Emulsion of Oil of Chenopodium. By Harry Joseph Meyers, Ph. G.	545
Permanent Syrup of Ferrous Iodide. By Joseph England, Ph. G.	547
Adulteration of Ground Elm Bark. By George M. Beringer, Ph. G.	552
Euphorbia Pilulifera. By James Hicks Bunting, Ph. G.	552
Dioscorea Villosa. By William Charles Kalltayer, Ph. G.	554
Gleanings from the German Journals. By Frank X. Moerk, Ph. G.	555
Abstracts from the French Journals	563
Water of Crystallization in Morphine. By O. Heise	568
Alkaloids in Human Urine. By J. L. W. Thudichum	567
Detection of Alkaloids after Death. By Dr. Pellacani	569

A New Constituent of Liver Oil. By H. Marpmann	570
Lard Adulteration with Cotton-Seed Oil	573
On Gualaccol. By D. J. Leech	573
Pharbitis Triloba as a Source of "Jalap"	580
On the Action of the Root of Apocynum Cannabinum. By Dmitry A. Sokoloff	581
Freezing mixtures containing solid Carbonic Anhydride. By L. Cailliet and E. Colardeau	582
Solubility of Magnesium Ammonium Phosphate in Alcohol. By A. J. Wakemann	583
Varieties	583
Minutes of the Pharmaceutical Meeting	584
Proceedings of the State Pharmaceutical Associations	587
Pharmaceutical Colleges	589
Reviews and Bibliographical Notices	589

NOTICE TO READERS.

This Journal is devoted to the advancement of PHARMACEUTICAL KNOWLEDGE and to the advocacy of a MORE THOROUGH EDUCATION and PRACTICAL TRAINING for all persons engaged in PREPARING and DISPENSING medicines, rugs and chemicals.

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THE AMERICAN JOURNAL OF PHARMACY.

NOVEMBER, 1888.

EMULSION OF OIL OF CHENOPODIUM.

By HARRY JOSEPH MEYERS, PH. G.

Abstract from a Thesis.

The volatile oil distilled from chenopodium, U. S. P., is well known to possess both a characteristic odor and taste. The anthelmintic properties which render this oil valuable, confine its use to the relief of children requiring such medication. The use of capsules for dispensing this oil not being adapted for children the question arises—how can this remedy be disguised, both in odor and taste, so that a practicable and palatable preparation can be dispensed. The form of an emulsion would appear to offer the best means for administration, and a number of experiments were made.

Oil of chenopodium has three distinct features in its taste, each of which is objectionable and which must be disguised or ameliorated. The most repulsive of these is the nauseous effect produced; not less offensive is the bitterness developed; combined with them is a sharp pungency which has an irritating action on the throat. A basic emulsion was prepared and flavoring drugs were incorporated with it. The teaspoonful dose contains about four drops of the oil of chenopodium, which averages 135 drops to the fluid drachm.

R. Oil chenopodium.....	f 3i.
Expressed oil almond.....	f 3iv.
Powdered acacia.....	4 oz. av.
Water q. s. ad.....	Oil.

Mix the oils thoroughly in a dry mortar, add the acacia gradually, rubbing the mixture to a uniform paste. Then add the bulk of the water, and agitate rapidly until a smooth emulsion is formed. Meas-

ure the liquid, and add sufficient water to make one quart. Mix by agitation. This formula furnishes a milk white emulsion, rather thinner than some preparations of a similar composition, and, owing to the small quantity of oil present, necessitating less acacia. The emulsion is permanent, does not "crack," and possesses the odor and taste of the oil of chenopodium, but slightly modified.

Mixtures were made of this emulsion with the volatile oils of almond, gaultheria, coriander, staranise, cloves, allspice, lemon and orange peel in various proportions; also with purified extract of licorice, saccharin, yerba santa and celery seed. None would afford a palatable preparation, but licorice and celery seed greatly improved the odor and taste, and the following modified formula is suggested, as best meeting the object in view :

Celery seed	℥ ii
Purified extract of licorice.....	℥ i.
Powdered acacia.....	℥ v.
Oil of chenopodium.....	℥ xxx.
Oil of almond (expressed)..	℥ ss.
Sugar.....	℥ iv.
Water q. s. ad	℥ iv.

Mix the seed with the extract and reduce to a very fine powder; triturate with sufficient water to form a thin liquid, and strain with expression. Emulsify the mixed oils in a dry mortar, with the acacia and sugar, using a little water if the paste becomes too thick. Finally add the strained liquid and form a perfect emulsion; add water to make the liquid measure four fluidounces.

The emulsion is a brown liquid, contains in a teaspoonful two drops of the oil of chenopodium, and has but a slight odor and a sweetish aromatic taste which is slightly pungent and cooling. The freshly prepared emulsion is to be preferred; but samples of it have been kept on hand for about a month, and were found to keep well, and to remain palatable. The addition of a small quantity of alcohol will render it still more permanent.

The dose of Salicin.—According to Dr. McLagan (*The Lancet*), salicin must be given in large doses in rheumatism, from 20 to 40 grains every hour, until there is decided evidence of its action. Generally before an ounce is given improvement has taken place, and as the symptoms decline the dose may be diminished.

PERMANENT SYRUP OF FERROUS IODIDE.

BY JOSEPH ENGLAND, PH. G.

Read at the Pharmaceutical Meeting, October 16.

Within the ever widening circle of modern pharmaceutical thought, there is probably no preparation in galenical pharmacy which from universal use and high medicinal value has been so fertile in criticisms and papers as syrup of iodide of iron. It would be trite and of little value for the writer to traverse ground so thoroughly familiar to you all, had he not secured what, in his opinion, was a perfectly practicable method of preserving this easily oxidizable liquid; a method against which there could be raised not the slightest objection on the score of chemical incompatibility or the introduction of objectionable compounds, and in favor of which, in this instance, everything could be fairly claimed as an ideal preservative.

Some months ago attention was attracted by the strong reducing action exercised by glucose upon ferric salts. If ferric salts, in aqueous solution, be slightly heated with glucose, especially syrupy glucose, they are quickly reduced to the ferrous state. A well known pharmacist of this city states that he has observed that pills of calomel, made with glucose, as an excipient, become reduced to black mercurous oxide. This property of reduction possessed by glucose, is a powerful and characteristic one, and is the one utilized in its quantitative estimation.

Such being the case, what is more reasonable than to assume that if it is opposed to oxidation so strongly, it would serve to protect easily oxidizable substances from oxidation, and practice bears out the truth that theory teaches. We have a familiar illustration of this application of glucose, although it is not generally recognized as such, in the preserving of "Vallet's Mass" with honey, and yet what ferrous compound is more prone to oxidation than ferrous carbonate?

Acting upon this idea, the writer made, early in last July, different specimens of ferrous iodide syrup, and first utilized, as more convenient, the commercial syrupy glucose; a mixture of glucose and dextrin. But this was found to be too powerful in its action. A large quantity caused the precipitation of ferrous oxide, and a small quantity permitted both oxidation and precipitation. Recourse was then had to solid glucose ($C_6H_{12}O_6$), and this was found to be less re-

ducing in its action, and, in proper quantities, capable of preserving the syrup intact, without precipitation or decomposition.

A sample of the syrup made last July and kept in an ordinary five pint stock bottle, is here shown. You will observe that it is a clear, transparent, greenish liquid, odorless, having a sweet, strongly ferruginous taste. It is neutral, but it should be mentioned, however, that litmus paper is no test of its neutrality since glucose in solution, especially syrupy glucose, will redden litmus. With potassium sulphocyanide the presence of a ferric salt is contra-indicated. It has kept during that time, although freely exposed to air, without the slightest change in color.

Relative to the present pharmacopœial process, it is, in essentials, the same as that of 1870, but in it there seems to have been ordered a change of procedure without any sufficiently compensating advantages, when it was directed to filter the aqueous solution of ferrous iodide into the sugar, heat to the boiling point and dissolve, instead of following the older and simpler plan, of mixing the filtrate direct with syrup. If the U. S. P. 1880 syrup had been made so as to contain full 65 per cent. of sugar, as in simple syrup, instead of 60 per cent. then the change might have been consistently ordered on the score of preservation, but as long as this was not done, it practically made little difference between the two formulas.

The formula is as follows:

Iodine,.....	875 grains.
Iron wire(Card Teeth),.....	800 grains.
Water,.....	3 fluidounces.
Glucose (solid),.....	2 troy ounces.
Syrup, a sufficient quantity, to make one pint.	

Mix the iodine, iron and water in a flask, shake occasionally until the reaction has ceased and the liquid has lost its iodine odor. Then heat to 212° F. (100° C.), filter into a capsule containing the glucose, finely cut up, dissolve at a low heat upon a water bath, and add sufficient syrup to make the desired quantity.

The watery solution of ferrous iodide is directed to be heated, after the reaction has taken place in the cold, in order to have thorough chemical combination. Very often this cold solution, although the liquid has lost its iodine odor, is of a yellowish color, which, however, on the application of heat, becomes the normal green tint; showing that heat, at the latter part of the process at least, is essential. A

water bath for the solution of the glucose is ordered, in view of the facility with which solutions of solid glucose, when strongly heated, become yellow.

The chemical decomposition which syrup of ferrous iodide undergoes, on exposure to air, has always been a matter of great interest and the subject of repeated studies. Prof. J. M. Maisch most admirably describes them when he states¹ that "on exposure to air the color of the syrup slowly changes to yellow and afterward to brown, the change of color proceeding from the exposed surface downward. Diffused daylight seems to somewhat accelerate the decomposition, but exposure to direct sunlight entirely prevents the change, or, if it has taken place, restores the original color, and finally renders the syrup colorless. The effects of oxidation become manifest first by the production of a ferric compound, and soon afterward by the liberation of iodine, recognized by the blue color produced with starch paste; subsequently hydrate of iron containing variable quantities of iodine is precipitated and after a short time this precipitate is not wholly redissolved again under the influence of sunlight, though the solution becomes colorless, perhaps from the formation of hydriodic acid."

Now, what do these facts indicate? They show us that the chemical change is essentially one of oxidation, with the formation, first, of a ferric compound, and a yellow or brown color, through the liberation of iodine; and, secondly, the precipitation of ferric hydrate and iodine.

If the oxidized iron compound is a ferric one, and that is admitted, it cannot be normal ferric iodide (Fe_2I_6), if such a compound does exist, which is disputed, since that compound, for its formation, would require more iodine than could be obtained from two molecules of ferrous iodide (FeI_2), and hence if a ferric salt is formed, it seems probable that it is an oxysalt; that is, ferric iodide, whose iodine atoms have been partially replaced by oxygen atoms.

The change in color to a yellow or a brown, through the production of free iodine, most probably indicates the formation of hydriodic acid whose presence was first claimed by Mr. Richard Phillips, Jr.,² with its subsequent decomposition by the air into free iodine and water.

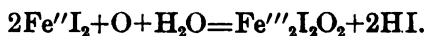
That there is an acid formed prior to the liberation of iodine is evi-

¹ National Dispensatory (3d Ed.) p. 1478.

² U. S. Dispensatory (15th Edt.) p. 673.

denced by the fact that the officinal syrup, although neutral in reaction when first made, gives, in the writer's experience, after a time an acid reaction with litmus, even when colorless.

There is no other iodine-derived acid which rapidly decomposes with the liberation of iodine than hydriodic acid, and it seems probable that the following chemical change may be the primary one:



In other words, ferrous iodide, in the presence of oxygen and water, is decomposed to yield, not ferric iodide, Fe_2I_6 , since that is impossible, but ferric iodide, four of whose univalent iodine atoms have been replaced by two bivalent oxygen ones, to form an oxyiodide, $\text{Fe}_2\text{I}_2\text{O}_2$, and then hydriodic acid, through a combination of the displaced iodine with the freed hydrogen atoms of the water. The probability of the existence of this oxyiodide is strengthened in the fact that Pettenkofer¹ has obtained an oxychloride with ferric chloride and ferric hydrate, having an analogous formula, $\text{Fe}_2\text{Cl}_2\text{O}_2$.

It is admitted that in the absence of its quantitative estimation, as a distinct chemical compound, the existence of this ferric oxyiodide ($\text{Fe}_2\text{I}_2\text{O}_2$) is purely theoretical. In view of the fact that the oxidation is a gradual one, the syrup being always, after oxidation commences, a variable mixture of ferrous iodide, a ferric oxysalt, free hydriodic acid, and iodine from decomposed hydriodic acid, it seems impossible to say just when *all* the ferrous salt has been oxydized into this ferric oxysalt if it all has been, prior to the formation of ferric hydrate, which is doubtful; and it seems impossible, then, to frame a method whereby its formula can be determined.

We know that, primarily, there is formed a free acid, which most probably is hydriodic acid, and that the formation of this acid is coincident with the production of this ferric oxysalt, but we cannot assert that this oxysalt is $\text{Fe}_2\text{I}_2\text{O}_2$ until it is proven such. It may be that there are possible by substitution only two ferric oxyiodides, $\text{Fe}_2\text{I}_4\text{O}$ and $\text{Fe}_2\text{I}_2\text{O}_2$. In that case the formation of the first one in this instance could not take place, because we know that the formation of the hydriodic acid is, as before mentioned, coincident with the production of the ferric oxysalt, and we would then be compelled to receive as more probable the other, $\text{Fe}_2\text{I}_2\text{O}_2$, with the assertion that if, in order to form the hydriodic acid, we must have sufficient iodine

¹ Gmelin-Kraut, "Anorganische Chemie," vol. 3, p. 360.

to combine with the hydrogen of the water, while the freed oxygen of that liquid, with that of the air, go to form the ferric oxysalt, then the reaction could only be explained, in chemical equation, with $\text{Fe}_2\text{I}_2\text{O}_2$.

After the formation of this ferric oxysalt and iodine, there follows a precipitation of ferric hydrate, which carries down with it variable quantities of free iodine; naturally variable, according to the extent which the hydriodic acid present has decomposed. If this ferric oxysalt is $\text{Fe}_2\text{I}_2\text{O}_2$, then this secondary change could be explained thus :



Relative to the fact that direct sunlight decolorizes oxidized syrup of ferrous iodide, that is most readily explained on the ground of the well known reducing property possessed by the sun. This peculiar property has been utilized by Alfred Fröh, in the preparation of a syrup of ferrous chloride from the officinal solution of ferric chloride (see A. J. P., 1882, p. 129), and another application of it is found in the recommendation of Hager, to deoxidize ferrous chloride which has been oxidized by exposure to air, by exposing it for several hours to direct sunlight, and hence it is easy to believe that ferric iodide in the presence of direct sunlight is reduced also.

Concerning the statement that the precipitated ferric hydrate, with its accompanying iodine, yields at first, on direct exposure to the sun, a colorless solution, that could be explained on the theory that there is yet remaining undecomposed a certain quantity of hydriodic acid, together with free iodine, which combine with the precipitated ferric hydrate to form a ferric iodide, or an oxyiodide, which is then reduced.

The older method of preserving syrup of iodide of iron with iron wire was apparently successful, because it permitted the freed hydriodic acid to combine with the iron before it could decompose into free iodine and water, but it seems plain that it did not prevent the formation of the ferric oxysalt and hydriodic acid, but merely preserved for a time the transparent color of the syrup, without retarding ultimate decomposition.

Savine in Cancer.—According to Dr. Lucæ (*Ther. Monatsh.*), the persistent application, three times a week, of powdered savine and burnt alum has cured a case of cancer of the ear.

ADULTERATION OF GROUND ELM BARK.

By GEORGE M. BERINGER, PH. G.

Read at the Pharmaceutical Meeting, October 16th.

Having had occasion recently to examine several samples of ground and pulverized elm bark, which were offered in quantity, I was convinced from physical qualities, odor, taste and lack of mucilage, that two samples—one pulverized, the other ground—offered by the same party, were largely adulterated. Surmising that the adulterant was grain of some kind, most likely corn, ground up with the bark; the smallest quantity of these samples boiled with distilled water gave with iodine an abundant reaction for starch. Pure elm bark (*liber alone*) should be free from starch.

Mr. Charles Bullock examined the specimen microscopically and detected both corn and potato starch. The potatoes were likely sliced and dried, and then ground up with the bark.

The following simple test would show the deficiency of mucilage in ground elm, and the likelihood of adulteration. Ten (10) grains of pure ground or pulverized elm bark, thoroughly shaken with one fluidounce of water, will in fifteen (15) minutes form a thick jelly-like mass of a good fawn color.

From the source from which these samples were produced, I have no doubt that a large quantity of such adulterated elm is in the market.

EUPHORBIA PILULIFERA.

By JAMES HICKS BUNTING, PH. G.

Abstract from a Thesis.

Euphorbia pilulifera is an annual herbaceous plant, thriving in all soils, and grows abundantly in the gardens and streets of the towns of tropical countries. It has been used to some extent in the form of decoction and fluid extract in asthma and bronchitis; also in neuralgia in conjunction with allied remedies. The freshly bruised leaves applied over a snake-bite, not only assuage the pain, but are said to remove the venom and heal the wound. A pinch of the dried powder, taken in some convenient menstruum, excites the heart and arouses the vital forces depressed by the poison.

An analysis was made of the drug in the chemical laboratory of

the Philadelphia College of Pharmacy. Using 50 gm. of the drug, powdered, results were obtained which may be summarized as follows:

SOLVENTS AND PER CENT.	REAGENTS, ETC.	CONSTITUENTS, ETC.
Petroleum spirit. Amount dissolved, 2.06 per cent.	Soluble in absolute alcohol. Soluble in 95 per cent. spirit. Residue from treatment with alcoholic potash.	Vegetable wax. Chlorophyll. Caoutchouc.
Stronger ether. Amount dissolved, 1.36 per cent.	Non-volatile principles, 0.56 per cent. Ferric chloride. HCl and dil. H_2SO_4 . Dried extract treated with absolute alcohol and water added. Reagents for alkaloids and glucosides. Volatile principle, 0.80 per cent.	Tannin. Chlorophyll. Resin. No change. Volatile acid.
Absolute alcohol. Amount dissolved, 1.13 per cent.	Gelatin. Dissolved out of dried extract by absolute alcohol and treated with water, etc. Reagents for alkaloids and glucosides.	Tannin. Resin and Chlorophyll. No change.
Distilled water. Amount dissolved, 10.9 per cent.	Precipitated by alcohol, 6.13 per cent. Incineration.	Veg. mucilage, 2.6. Sugar, 0.6. Other carbohydrates, 4.1. Ash, total amount, 4.77.
Water with .2 per cent. sodium hydrate. Amount dissolved, 2.6 per cent.	Precipitated by alcohol, 2 per cent. By incineration.	Mucilage and albuminoids. Ash, 0.6 per cent.
Water with 1 per cent. hydrochloric acid. Amount dissolved, 5.8 per cent.	Precipitated by NH_4HO as Ammonium oxalate. By incineration.	Calcium oxalate 2.04 per cent. Ash, 3.4 per cent.
Chlorine water. Amount dissolved, 15.96 per cent.	Dissolved out by chlorine water. Residue.	Lignin. Cellulose, etc.

Undissolved residue, 60.19 per cent. Constituents: Wax, caoutchouc, chlorophyll, resin, tannin, sugar, mucilage, carbohydrates, albuminoids, calcium oxalate and other salts.

March, 1888.

Mercuric iodide soap is stated (*Lancet*, May 12), to be a powerful antiseptic. The mercuric iodide is incorporated with the soap together with potassium iodide.

DIOSCOREA VILLOSA.

By WILLIAM CHARLES KALTEYER, PH. G.

Abstract from a Thesis.

Wild yam root, colic root, rheumatism root, are the names given to the rhizome of *Dioscorea villosa*, which grows from Maine to the far West and South. The rhizome and its preparations (fluid extract, tincture, infusion, so-called dioscorein) are mostly used by the eclectics, who consider them very efficacious in bilious colic. The rhizome of the plant was subjected to an analysis, Dragendorff's plant analysis being used as a guide.

Fifty gm. of the drug in No. 80 powder were treated with petroleum spirit at an ordinary temperature. This extracted 0.208 per cent. of a light-colored fixed oil and a crystalline wax. The wax separated from the oil, and, purified by treating with alcohol, crystallized in fine stellate needles, having a silky lustre, melting at 115°C. The oil and wax were soluble in absolute alcohol. No volatile oil was found in this extract, nor was any obtained by distillation from another portion of the drug. The drug after drying was next exhausted with ether; this extracted 0.450 per cent. of a solid resinous matter. The ethereal extract, treated with water and filtered, reduced Fehling's solution, due to a glucoside present, but this could not be investigated any farther. The drug was then treated with absolute alcohol, which extracted 8.440 per cent. of a resinous mass, having a very acrid and bitter taste, and totally soluble in water. Applying the usual tests for tannin, it was found not to exist in the rhizome. The aqueous solution, acidulated and rendered alkaline, was agitated successively with petroleum spirit, benzol, chloroform and ether, but nothing was taken up, the liquid retaining the same bitter and acrid taste as before agitation. The solution was then evaporated on a water-bath, dissolved in alcohol, evaporated again, redissolved in water, treated with purified charcoal, filtered and placed in a desiccator, when a brown amorphous substance was left, having a bitter and acrid taste, but all efforts made to crystallize this principle were unsuccessful.

To water the drug yielded 20.16 per cent. of solid matter having an acrid and salty taste, and containing 5.256 per cent. of saccharose, 0.257 per cent. glucose, 0.684 mucilage and extractive matter.

The portion of the drug which was insoluble in the foregoing menstrua, was then treated with 0.2 per cent. solution of caustic soda, and

yielded 6.65 per cent. of extract, consisting of 1.98 per cent. of albumen and 4.67 per cent. of phlobaphene.

A 2 per cent. solution of hydrochloric acid extracted 0.920 per cent. of extractive matter.

The drug was then boiled with dilute sulphuric acid to convert all the starch present into glucose; it amounted to 7.425 per cent.

The residue on being treated with chlorine and chlorine water lost 3.66 per cent. in weight due to the amount of lignin dissolved. Treatment with nitric acid (sp. gr. 1.16) and chlorate of potassium, dissolved 0.980 per cent. of intercellular substance. The residue consisting of cellulose amounted to 32.440 per cent.

Another portion of the drug yielded 7.25 of moisture and 2.38 per cent. of ash.

Distillations of fresh portions of the drug with lime and with sulphuric acid yielded nothing of importance.

From all the tests applied in the foregoing, the conclusion is reached that there is saponin or an allied substance present in considerable quantity. Upon agitation of the aqueous solution, the characteristic froth of saponin was produced and the acrid taste which characterizes this principle was plainly apparent to the taste, but all efforts made to separate above principle in a crystalline state were fruitless.

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH. G.

Conium Fruit Extracts.—The alkaloidal determination presents so many obstacles that for it was substituted the amount of precipitate caused by Mayer's reagent in an acidulated aqueous extract, every cc. reagent representing 0.0138 gm. In the U. S. extract correction had to be made for the glycerin which reduces the quantity of Mayer's reagent.

AUTHORITY.	Yield of Extr. from drug.	Solid mat- ter in Ex- tract.	Precipitated Substance calculated in per cent. for			Percent- age of pre- cipitable substance extracted.
			Normal Extract.	Dry Extr.	Material.	
Fruct. Conii					0.495	100.0
Extr. Gall.....	10.8	81.4	2.491	3.057	0.269	54.3
" U. S.....	15.2	.....	8.255	.....	0.494	99.9
" Intern.....	10.4	73.3	8.970	5.416	0.421	85.2
" Fl., U. S.....	94.8	11.6	0.538	4.655	0.494	99.9

Conium leaves contained only 0.24 per cent. of matter precipitated by Mayer's reagent.—R. Kordes, *Pharm. Ztschr. f. Russl.*, 1888, 455.

Narceine has been carefully studied by Claus and Meixner (*Journ. Prakt. Chem.*) and a close relationship to naphthalin disclosed. By oxidation of pure narceine $C_{23}H_{29}NO_8$, with permanganate in dilute sulphuric acid solution a tribasic acid narceinic acid, $C_{15}H_{15}NO_8 + 3H_2O$, was gotten which on heating to 180° – 200° decomposed into carbonic oxide, dimethylamine and dioxynaphthalic acid $C_{12}H_8O_6$.—*Rdsch.*, 1888, 700.

Secale cornutum in drying should be placed in thin layers, the last portions of moisture being removed over lime or sulphuric acid in a dessicator. Stored in corked yellow bottles so-dried ergot will keep for several years and be of superior quality.—F. Alpers (*Pharm. Zig. Chem. Rpt.*, 1888, 233.

Unguentum boroglycerinatum, a substitute for iodoform and carbolic acid ointments and a superior preparation of boric acid, is made by taking of boric acid, 10 parts, and glycerin (sp. gr. 1.23), 30 parts, boiling for 10 minutes; after cooling to 50° make an ointment by addition of lanolin 40 parts, finally add paraffin ointment (sp. gr. 0.890) 20 parts. This last addition has the effect of diminishing the rapid absorption of lanolin. In appearance the ointment resembles cold-cream.—Koehler, *Schwz. Wehnschr. f. Pharm.*, 1888, 261.

Liquor ferri dialysati and oxychloridi.—M. C. Traub finds that there are decided differences in the properties of these two preparations, and disapproves of the substitution of the latter for the former. The oxychloride solution is made by dissolving ferric hydrate in hydrochloric acid; it contains 0.8 per cent. HCl, is of a decided acid taste and reaction, and is not adapted for making the albuminate solution owing to its frequent gelatinization. The dialyzed solution contains only 0.25 per cent. HCl, is of a mild taste and neutral reaction, and will form a permanent albuminate solution.—*Schwz. Wehnschr. f. Pharm.*, 1888, 255.

Carbon disulphide in oil of mustard.—The first detection of carbon disulphide in the volatile oil of mustard was attributed to adulteration, but the statement of the producer that his oil was made from the seeds of *Sinapis juncea* caused new experiments to be made as the result of which Hoffmann established the presence of carbon disulphide in the oil of *Sinapis juncea*, as well as in the oil of *Brassica nigra* and the artificially prepared oil. Paul Birkenwald uses the following mode

of examination: 1 cc. is measured into a tared stoppered flask, the weight of the oil ascertained, 10 cc. absolute alcohol added to dissolve the oil and agitated after addition of 20 drops of an alcoholic potassium hydrate solution until the odor of the oil has entirely disappeared. The contents of the flask are then dissolved in water, acidulated with acetic acid and titrated with $\frac{1}{10}$ n. copper sulphate solution (12.47 gm. per liter). The end of the reaction is ascertained by obtaining a red coloration or precipitate if a drop of the solution is placed on blotting paper and a drop of potassium ferrocyanide solution added. Each cc. of the copper solution represents 0.0086 gm. carbon disulphide.

According to age and quality of the oil from 8.14 per cent. to 41.03 per cent. of CS_2 were found; self-prepared oil of mustard contained from 9.82 per cent. to 10.82 per cent. diminishing in a year's time to 2.03 per cent. (one specimen to 0.91 per cent.) of CS_2 ; the artificial oil averaged 10.78 per cent. The origin of the CS_2 is not definitely made out, but the decomposing effect of steam and the presence of KHSO_4 influence its formation; by heating oil of mustard with KHSO_4 an increase of CS_2 from 0.45 to 2.29 per cent. was observed. The oil obstinately retains the carbon disulphide, and they can not be separated completely by distillation. A comparative examination of the seeds of *Brassica nigra* and *Sinapis juncea* was made:

	Brassica nigra.	Sinapis juncea.
Moisture.....	8.47 p. c.	7.63 p. c.
Ash.....	5.04 "	4.52 "
Phosphoric Acid.....	1.84 "	1.89 "
Soluble in Petrol. Spirit }	29.37 "	30.10 "
" Ether	0.93 "	1.30 "
" Abs. Alcohol }	0.80 "	1.25 "
" 75 p.c. " }	6.77 "	6.40 "
Nitrogen.....	4.50 "	4.21 "
Sulphur.....	0.61 "	0.54 "
Vol. Oil (calcul. from amount of S.).....	1.89 "	1.67 "

—P. B. in *Schw. Wchnschr f. Pharm.*, 1888, 277.

Mel rosatum.—1 part rose leaves and 6 parts boiling water are mixed and allowed to macerate for 24 hours in a covered vessel. To the strained liquid is added 9 parts crude honey, and this solution heated on the water bath until the precipitate coagulates, which, after cooling, is filtered off; the filtrate is evaporated to a syrupy consistence. The tannin of the rose leaves unites with the albuminous principles of the honey, and after the removal of the precipitate a honey

is obtained, which remains transparent and will not ferment.—*E. Schaaff, Apoth. Ztg.*, 1888, 680.

Chloroform—Tests of purity for.—The use of chloroform as an anæsthetic calls for a preparation which shall stand the following tests :

1. Three hundred gm. are distilled on a water-bath until about 2 cc. remain in the flask or retort ; on addition of concentrated H_2SO_4 to this residue no darkening should take place, nor should an odor of amylic compounds be developed.

2. Forty gm., shaken repeatedly with 30 gm. concentrated H_2SO_4 , in a glass-stoppered bottle, previously rinsed with H_2SO_4 , should not darken within 48 hours.

3. The chloroform decanted from the above test, after the addition of a zinc iodide starch solution, should not blue this, and should not itself become red.

4. The chloroform from 2 shaken with distilled water, and the latter filtered into solution of silver nitrate, should cause no change.—*Schwarz and Will., Pharm. Ztg.*, 1888, 551.

Chloroform, flavored with oil of cloves, is recommended by Prof. Nussbaum in cases in which pure chloroform produces nausea and vomiting.—*Rdsch.*, 1888, 759.

Rose water, made with magnesium carbonate and used in eye-waters containing salts of lead or zinc, will produce precipitates which may be very irritating.—*Kottmayer, Pharm. Post*, 1888, 598.

Examination of Strychnos Extracts.—The extracts, if fluid, evaporated under an air-pump to thick consistence in order to remove alcohol, are triturated with water, and after the complete removal of the fat by agitating with petroleum spirit, the mixture is evaporated to dryness, mixed with lime, and extracted for $1\frac{1}{2}$ hours with ether in a continuous displacement apparatus. The ether is removed by evaporation, the residue dissolved in a little alcohol, 10 cc. water added, and this solution titrated with $\frac{1}{10}$ n. sulphuric acid. The extraction is repeated with a second portion of ether for one hour, the acid required in this neutralization being added to the first quantity. Every cc. H_2SO_4 used is considered the equivalent of 0.00364 alkaloid (the brucine and strychnine being assumed present in equal ratio). In the aqueous extracts, the brucine is present in three times the amount of the strychnine, due to the greater solubility of the former in water. In the following table attention has been given to points of interest in the processes for making the extracts :

TABULAR REVIEW OF THE VARIOUS STRYCHNOS EXTRACTS.—R. Kordes, *Pharm. Zsch. f. Russl.*, 1888, 537.

AUTHORITY.	Menstruum pre- scribed for one part of the seed.	Sp. grav. of the Alco- hol menstruum.	Time allotted to mac- eration.*	Temperature of mac- eration, or of men- struum.	Consistence of Ex- tract.	Yield of Extract from Seed.	Solid matter in Ex- tract.	Percentage of To- tal Alkaloid cal- culated for—			Alkaloid extracted.	Per cent of Strychnine in Normal Extract.	Percentage of Strych- nine extracted.
								Normal Ex- tract.	Dry Exct.	Material.			
Sem. Strychnit	7 parts water.....	.....	2 days	Boiling.....	Dry.....	15.00	100.0	3.880	3.880	1.7325	100.0	.....	0.8667
Ext. aq. Ross.....	8 parts water.....	.....	2 "	".....	Dry.....	15.00	100.0	3.880	3.880	0.5800	33.4	0.984	0.1450
" " Helv.....	4 parts water.....	.....	1 1/2 "	15°-20°.....	Dry.....	16.00	100.0	3.880	3.880	0.5800	33.4	0.984	0.1450
" " Dieterich	Until exhausted	0.846	*2	Warm.....	Fluid.....	89.30	.....	3.112	3.112	0.4980	28.7	0.778	0.1425
" fl. U. S. P.....	8 parts.....	0.892	4 "	Digested.....	Thick.....	16.20	66.8	10.001	14.900	1.6216	98.6	5.005	0.8108
" spir. Austria.....	Until exhausted	0.884	†4	15°-20°.....	Not definite	.....	.....	15.000	.....	.....	.....	7.500	.....
" " Britann	5 parts.....	0.830	4 "	Digested.....	Thick.....	11.60	72.6	11.739	16.160	1.3617	78.6	5.869	0.6808
" " Fennic.....	8 "	0.863	6 "	Macerated.....	Pillular.....	10.00	80.0	13.245	16.550	1.3245	76.4	6.622	0.6622
" " Gall.....	3 1/2 "	0.894	2 "	To 40°.....	Dry.....	9.60	100.0	12.740	12.740	1.2230	70.6	6.370	0.6115
" " Germ.....	4 "	0.890	2 "	Short of dist.	Thick.....	13.50	74.5	10.510	14.169	1.4189	81.9	5.255	0.7094
" " Helv.....	.....	.....	.....	of Alcohol.	.....	.....	.....	.....	.....	.....	.....	.....	.....
" " Ross.....	3 1/2 "	0.888	4 "	50°-60°.....	Dry.....	9.75	100.0	12.649	12.649	1.2330	70.6	6.324	0.6165
" " Ross proj.....	5 "	0.834	6 "	65°.....	Dry.....	7.00	100.0	13.741	13.741	0.9618	55.5	6.870	0.4809
" " U. S.....	Until exhausted	0.846	*2	Warm.....	Pillular.....	11.50	80.9	14.287	17.660	1.6430	99.7	7.143	0.8210
" " Dieterich.....	3 1/2 parts.....	0.894	.....	To 40°.....	Dry.....	9.50	103.0	12.831	12.831	1.2190	70.3	6.415	0.6090
" " Intern.....	Until exhausted	0.890	*2 days	15°-20°.....	Thick.....	16.70	70.3	10.328	14.681	1.7240	99.4	5.164	0.8620
" " sicc., Ross.....	Sp. Ext., with equal weight of Dextrin.	.....	.....	.....	Dry.....	19.50	100.0	6.324	6.324	.....	.....	3.162	.....

* Followed by percolation.

† The seed yielded to petroleum spirit 4.2 per cent. oil, solid at ordinary temperature.

Glycerin Suppositories.—Ten parts dry, dialyzed stearin soap are dissolved in boiling water, mixed with 90 parts pure glycerin, filtered by means of a hot-water funnel, the filtrate evaporated to 100 parts and poured into moulds. Two sizes are made, weighing respectively 1·7 and 2·5 gm., corresponding possibly to our 15 and 30 gm. suppositories. They are wrapped in tin-foil, to prevent absorption of moisture.—*E. Dieterich, Pharm. Centralh.*, 1888, 445.

Oleum cinereum benzoatum; improved formula.—20 parts mercury are triturated with 5 parts of an ethereal benzoin solution (ether 40, benzoin 20, oil of sweet almond 5; after solution, filter) until the ether has evaporated, when 40 parts fluid paraffin are added and the trituration continued.—*Dr. Harting, Pharm. Post*, 1888, 600.

Test for free sulphuric acid.—Egger proposes the furfural color reaction (see *AMER. JOUR. PHAR.*, 1888, p. 506) as a test for free sulphuric acid, and his experiments show that 1 cc. of $\frac{1}{1000}$ normal sulphuric acid (containing 0·000049 gm.) warmed on a water-bath with a small particle of cholic acid and two drops of a furfural solution, will give a decided red coloration.—*Chemiker Ztg.*, 1888, 1245.

Permanent starch paste for volumetric analysis, also for technical purposes, is made by mixing 50 parts potato starch and 0·1 part biniodide of mercury with a little water and adding this mixture free from lumps to 10·000 parts boiling water (for technical use less water is taken and the paste boiled); after standing the liquid is decanted. This solution will not lose its sensitiveness if kept for a year.—*Gastine (Bull. Soc. Chim.) Rdsch.*, 1888, 783.

Creolin according to B. Fischer contains hydrocarbons 66, phenols 27·4, organic bases 2·2, ash 4·4, composed of Na_2SO_4 , NaCl and Na_2CO_3 . It is made by freeing that portion of coal-tar boiling between 180 and 220° from carbolic acid. Its property of emulsifying with water is probably due to the presence of small quantities of phenol sulphonates and pyridine sulphonates.—*R. Otto, Phar. Cntrlhalle*, 1888, 467.

Creolin-iodoform, a mixture of iodoform with one or two per cent. creolin, is considered by Dr. Jaksch to be the best antiseptic and deodorized preparation of iodoform yet offered. It is of a faint aromatic odor, soluble in alcohol and ether; water removes the creolin, leaving the iodoform.—*Pharm. Post.*, 1888, 630.

Liquor antisepticus.—Menthol 0·2, thymol 0·5, boric acid 2·0, sodium salicylate 1·0, sodium benzoate 1·0, oil of gaultheria gtt. vi,

oil of eucalyptus gtt. xviii, glycerin 15·0, liquirit 60, water 180·0.
—*Apoth. Ztg.* 1888 No. 56.

White wax obtained from yellow wax by sun bleaching does not differ from this in composition; if, however, yellow wax be bleached by use of chemicals the product is altered considerably, so that it may even be pronounced adulterated by the analyst. Hübl finds that the ratio of *acidity* to the *compound ether* is as 1 : 3·7, and this has been confirmed by other investigators.

Acidity represents the number of milligrams of KOH required to neutralize a warmed alcohol mixture containing 1 gm. wax; this figure should be between 19 and 21. *Compound ether* figure is obtained by boiling for one hour the above neutralized wax with excess of alcoholic KOH; the neutralized KOH, in milligrams, furnishes the figure, varying between 73 and 76. The *saponification* figure is the sum of the *acid* and *compound ether* figures and should be between 92 and 97.

The following figures have been ascertained by Hübl for wax and some of the possible adulterants:

	Acidity.	Compound Ether.	Saponification.	Ratio.
Yellow Wax,	20·00	73·80	98·88	1:3·67
White " sun bleached,	19·87	74·95	94·82	1:3·77
" " chemically, " I,	22·02	76·15	98·17	1:3·45
" " " " II,	24·00	74·56	98·56	1:3·10
Japan "	20·	200·	220·	1:10
Carnauba Wax,	4·	75·	79·	1:19
Tallow,	4·	176·	180·	1:44
Stearic Acid,	195·	—	195·	—
Rosin,	110·	1·6	112·6	1: 015
Paraffin,	—	—	—	—
Ceresin,	—	—	—	—

—*Chem. Ztg.*, 1888, p. 1277 and *Pharm. Zisch. f. Russl.*, 1888, 579.

Fluid Extract of Hydrastis on standing deposits a yellow precipitate which is generally considered to be berberine or one of its derivatives. By recrystallization from glacial acetic acid this substance is obtained in colorless crystalline scales, melting at 133°, which on examination prove to be *phytosterin*, a vegetable cholesterin-like body. *Fluid Extract of Berberis Aquifolium* also contains this principle.

The *berberine sulphate* of the market, even when marked *chemically pure*, was found to contain chlorine. The alkaloid *berberine* can be obtained pure by dissolving the salt in acetone and crystallizing; the resultant acetone berberine is dissolved in alcohol and decomposed by

passing CO_2 through the solution, the precipitate formed consists of pure berberine carbonate, which, if warmed in a current of hydrogen, yields the pure alkaloid.—*E. Schmidt, Pharm. Ztg.*, 1888, 572.

Stylophorum diphyllum, Nuttall.—The root of this American plant contains chelidonine with a second alkaloid closely related to, if not identical with chelerythrine.—*E. Schmidt, Pharm. Ztg.*, 1888, 572.

Corrosive sublimate bandages after a time contain the mercuric chloride in an insoluble form; from the results of M. Haupt, the material used for the bandage appears to have some effect on this change. Wadding after seven months retains one-half of the mercuric chloride in soluble form, with mull this point is reached after five months, and with cambric in about three months; this change gradually becomes complete, as specimens (one year old) contained either very small quantities or none at all. To preserve the solubility of the HgCl_2 , additions of ardim chloride or tartaric acid are made. In examining bandages which should contain 0.4 per cent HgCl_2 it was observed that the quantity never exceeded 0.335 per cent., indicating a loss of 16 per cent. occasioned by drying the impregnated material. *Pharm. Centralh.*, 1888, 458.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the AMERICAN JOURNAL OF PHARMACY.

PURIFIED WATER.—The boiling of water "to kill the microbes" has sometimes been recommended by physicians. M. Tellier has shown that this cannot be effected by a temperature of 212°F . He also observed that boiled water, being deprived of its air, is heavy and indigestible, and that through loss of the calcareous salts it becomes insipid, and is disagreeable to drink. He prepares water in a closed vessel, placed in a salt and water bath, by which he gets a temperature of 300°F . In using, the water is drawn from a filter-faucet placed near the bottom of the vessel. A small faucet at the top, to admit the air, is kept covered with cotton.—*Arch. de Phar.*, Oct. 5, 1888.

TOILET CREAM OF LANOLIN. M. Fassati sends the following formula to the *Arch. de Phar.*, Oct. 5, 1888, which he declares to be "very efficacious for tan, pimples, acne, and other simple affections of the skin": Lanolin, 5 gm.; sulphur (precip.), 5 gm.; oil of sweet almonds, 5 gm.; oxide of zinc, 2.50 gm.; ext. violet, 50 cgm.; ext. alkanet q. s. to obtain a flesh tint. It should be applied as a very thin

coat, over which starch or steatite may be powdered. The lanolin makes it easily absorbable, and its color renders it suitable for use in the day-time.

CREOLIN PILLS.—Spoeth's formula is given by the *Semaine méd.* as follows: Creolin, 12 gm.; dilute alcohol and tragacanth, of each, 2 gm.; ext. and powder of licorice, of each, 24 gm.; divide in 200 pills, each of which will contain 6 cgm. of creolin. They are especially recommended by M. Spoeth for arresting abnormal fermentation in the intestines in all infectious maladies.—*J. de phar. et de chimie*, Oct. 1, 1888.

TO MAKE POROUS ALUM.—Make a solution free from iron, and concentrate it in an evaporator; add minute quantities of bicarbonate of sodium and stir briskly. The carbonic acid gas gives the required porosity to the crystalline mass.—*Farm. Ital.; Arch. de Phar.*, Oct. 5, 1888.

SOLUBILITY OF COMPOUNDS OF IRON WITH ARSENIC.—In a report published in the *Jour. de phar. d'Als.-Lorr.*, Sept. 1888, Schlagdenhauffen and Reeb conclude that: The solubility of samples of arseniate of iron—obtained from various sources—is not the same. None of the arsenical compounds with iron are so insoluble as writers have supposed them; they dissolve in the proportion of $2\frac{1}{2}$ to 1000 in water acidulated with hydrochloric acid, and some samples dissolved in pure water. The hydrated sesquioxide of iron cannot, therefore, be *par excellence*, the antidote for poisoning by arsenic.

IODOFORM AS A HÆMOSTATIC.—Chauvin and Jorissenne report great success with iodoform in hemorrhages from the lungs and other serious hæmoptyses; relapses were rare and of lessened severity; it succeeded where ergotin was inert. In a majority of cases the iodoform was associated with tannin in small doses, but the authors regard iodoform as the active agent. The formulæ used are as follows: 1. Iodoform, 5 cgm.; ext. gentian, or quinine, q. s. for one pill. 2. Iodoform, 5 cgm.; tannin, 10 cgm.; any suitable excipient; for one pill. Dose, 3 to 5 pills daily. In six months of successful treatment it was rarely necessary to give more than 8 or 9 pills daily.—*Revue méd.; Monit. therap.*, Oct. 1, 1888.

ANILINE POISONING.—An interesting case is described by Dr. Dehio, *Ann. d'hyg.; Bull. com.*, September, 1888. A young woman, recently delivered, swallowed 10 gm. of aniline. The symptoms, quickly manifested, were cyanosis, acceleration of pulse, dilation of

of the pupils and aniline odor of breath. The immediate effects on the nervous system were shown in 24 hours by coma, absence of cutaneous reflexes and voluntary motion, quick pulse (132), increased respiration (25), and profuse transpiration, the latter occurring 30 hours after ingesting the poison. On the second and third days the improvement was marked. Besides the purely nervous symptoms there was an abnormal coloration of the skin. Twenty-one hours after ingestion the urine contained traces of the colorants of the bile, and the serum was yellowish-red; from the second to the fifth day the urine contained more and more biliary pigment; on the third day an icterus appeared, which lasted until the ninth. A dark color of the urine from the sixth to the tenth day was due to hæmoglobinuria; the urine afterward became normal. The destruction of sanguineous globules was rapid and formidable; the normal 5,000,000 per ccm. fell to 2,700,000 on the seventh, and 1,400,000 on the eleventh days. The globules were replaced slowly; on the eighteenth day their number was about one-third of the normal quantity. Convalescence returned with the disappearance of hæmoglobinuria. Aniline may be classed with those poisons which produce the latter condition simultaneously with icterus.

STRYCHMOL, OR HYDRATE OF STRYCHNINE.—This is obtained as a white precipitate by boiling strychnine in a solution of caustic soda with alcohol, evaporating and directing a jet of carbonic acid gas upon the residuum after dissolving it in water. The reaction of strychnine with chromate of potassium is not obtained with strychmol. With sulphuric and nitric acids, strychmol gives a bright, carmine color. Boiled in dilute acids it decomposes into strychnine and water. Its formula is $C^{21}H^{22}N^2O + H^2O$.—*Le monde phar.*, Sept., 5, 1888.

ARGANINE.—M. S. Cotton of the Lyons Pharmaceutical Society has completed a study of the Argan tree, indigenous to Madagascar, and known to Europe through its wood, which is used by cabinet makers. From the argan nut the natives express an oil which they use for culinary purposes; the cake is fed to cattle. This oil, treated with Poutet's reagent (mercury and nitric acid) thickens in about twelve hours, but does not solidify like olive oil. The nut contains about 2 per cent. of vegetable albumin; the quantity of oil in it varies from 66 to 77 per cent. Its bitter principle, though insoluble in ether, chloroform, sulphide of carbon and mineral oils, dissolves readily in alcohol 90 per cent. and in water. It crystallizes from alcohol in small, short,

brilliant prisms. With sulphuric acid it forms a definite combination appearing in beautiful elongated prisms. M. Cotton has given the alkaloid the name "arganine" in memory of its botanic origin.—*J. de pharm. et de chim.*, Oct. 1, 1888.

HEDWIGIA BALSAMIFERA.—Gaucher, Combemale and Marestang describe this plant to the *Acad. des Sci.*, as one of the terebinthaceæ growing in the Antilles. The authors tested its physiological effects with extracts from the bark of both roots and stems, given hypodermically to guinea-pigs. It caused rapid and considerable lowering of temperature; progressive paralysis; generalized convulsions; pupilar dilation; vaso-dilator phenomena; and, in mortal intoxication, respiratory irregularity and cardiac paresis. They found it to be a nerve poison, hypothermic, paralyzing and spasmodic, affecting the medulla. The extract was observed to contain an alkaloid and a resin, the former being more especially a convulsivant and the latter a paralyzing agent. The resin appears to be more active than the alkaloid. Apart from its antithermic qualities, the extract seems to act like curare.—*L' Union méd.*, Oct. 6, 1888.

SALICYLATED EGGS.—According to the *Bull. de pharm. de Lyon*, the merchants of that city are now preserving eggs in salicylated water instead of lime water. The merchants claimed that the preservation was due to the fact that the water was kept purified by the acid, which latter could not, however, penetrate to the substance of the egg. M. Lambert, a local pharmacist, finds nevertheless, that the salicylic acid passes through the membrane by endosmosis and becomes diffused into the yelk. His tests were as follows: Beat up the white with a little acidulated water and agitate with ether, which, on evaporation leaves the salicylic acid, characterized by its reaction with weak perchloride of iron. The same method is used for the yelk, whose albumen should first be coagulated by heat in order to keep the oil from emulsifying.

The Abuse of Antipyrin.—That antipyrin is being very generally used without the advice of a physician, appears from the evidence which has been obtained from both physicians and druggists. It is said to be not an uncommon thing for those who suffer from headaches to purchase the drug and take it in twenty grain doses, entirely unconscious that they run any risk in so doing. Evidence is accumulating that antipyrin so used is fraught with danger, and there are already enough cases recorded of the production of alarming symptoms by small doses to put even physicians on their guard against the indiscriminate use of the drug.—*Brooklyn Medical Journal*, June, 1888.

THE AMOUNT OF WATER OF CRYSTALLIZATION IN MORPHINE.¹

BY O. HESSE.

Until recently it was generally considered that morphine dried at 100° C. had the composition represented by the formula $C_{17}H_{19}NO_3 + H_2O$, notwithstanding that several years since I pointed out that at this temperature the alkaloid would lose its water of crystallization. Subsequently, however, Dott showed² that morphine is already anhydrous at 90° C. Dieterich has also recently found³ that the above formula does not hold good for the alkaloid dried at 100° C., and is equally inapplicable to the air-dried substance, since, instead of the calculated amount of water (5.94 per cent.), 6.39 per cent. was obtained. Dieterich, however, only carried out one experiment, so that control was wanting. Meanwhile it must be remembered that Dott also found more water, and upon the basis of his experiments represented the air-dried alkaloid by the formula $8(C_{17}H_{19}NO_3) + 9H_2O$, which requires 6.62 per cent. of water, whilst the average of that found was 6.56 per cent.

Against this average value, however, some objection can be raised. In the first place it may be observed that morphine frequently encloses small quantities of the solvent from which it has been separated, and which under ordinary conditions escapes with difficulty or not at all. In order therefore to render this accident harmless in the determination of the water it is necessary to rub the crystals to a fine powder, which Dott does not appear to have done, so far as can be inferred from his communication.

The last two quantities given—6.22 and 6.35 per cent.—correspond very well with the formula hitherto accepted, but differ considerably from the quantity calculated for the more complex formula and also that found by Dieterich. As Dieterich found practically more water than Dott, it seemed to me that an occasion presented itself to me to repeat my determinations on the point. A freshly precipitated preparation, operated upon in accordance with the previously mentioned facts, gave, after forty-eight hours, water of crystallization

¹ From the *Pharmaceutische Zeitung*, August 11.—Reprinted from *Pharm. Journal and Transactions*, August 25, p. 148.

² *Pharm. Journal*, [3], xviii., 701.

³ *Pharm. Centralhalle*, 1888, p. 317.

equal to 5.99 per cent., and after a further forty-eight hours equal to 5.91 per cent. The temperature of heating reached 110° C.

The correspondence of the value found with that calculated for the value $C_{17}H_{19}NO_3 + H_2O$, is evidently such as to leave no doubt as to the correctness of that formula, and it may therefore be assumed that the excess of water which Dieterich found depended only upon accident.

ALKALOIDS IN HUMAN URINE.¹

By J. L. W. THUDICHUM.

The urine was mixed with 5 per cent. of sulphuric acid previously diluted with twice its own volume of water, and the alkaloids were precipitated by phosphomolybdic or phosphotungstic acid. The precipitate was washed, treated with barium hydroxide and barium carbonate, care being taken to avoid an excess of hydroxide, and the deep red solution thus obtained was filtered. If ferric chloride is added to the red liquid, it produces a bulky precipitate, which contains *urochrome*, the coloring matter of the urine in combination with iron. This urochrome may be isolated in several different ways, and then treated with sulphuric acid, or the precipitate may be treated directly with the acid. In either case, the product answers to the description given by Proust in 1881. It is a deep, violet-red, bulky precipitate, which when treated with ether yields a resin and a mixture of omicholin and omicholic acid. The portion insoluble in ether consists of a red compound, *uropittin*, soluble in alcohol, and a black resin, *uromelanin*.

Omicholin has approximately the composition $C_{24}H_{38}NO_5$, and is a red, resinous substance, insoluble in ammonia, but soluble in ether and alcohol. Its solution shows a bright green fluorescence, and gives an absorption-spectrum consisting of a band between D and E.

Omicholic acid has the composition $C_6H_{22}NO_4$, and is also a resinous, red substance soluble in ether or alcohol, forming a solution which shows a green fluorescence and gives an absorption-band between D and E. This band is, however, narrower than the band given by omicholin. Omicholic acid is soluble in ammonia, and is reprecipitated by acids.

Uropittin was not obtained pure. It is always mixed with one or

¹ *Compt. rend.*, cvi., 1803—1806; reprinted from *Jour. Chem. Soc.*, October, p. 1119.

other of its modifications, *meta-uropittin* and *uro-rubin*, and is partially altered by contact with the oxygen of the air. It contains 11 per cent. of nitrogen. Its alcoholic solution is red, and gives an absorption-band at F.

Uromelanin has the composition $C_{38}H_{43}N_7O_{10}$, and is insoluble in alcohol or ether, but dissolves in dilute solutions of the alkalis, from which it is precipitated by acids. With silver, barium, calcium, lead, and zinc it forms basic and acid salts. The silver salt has the composition $C_{38}H_{40}AgN_7O_9$. *Uromelanin* is a very stable substance; the quantity excreted by an adult is 0.3 to 0.5 gram per day.

Neither *urochrome* nor any of the other products can be obtained crystallized. *Urochrome* is an alkaloid, the function of which is as yet unknown. The products of its decomposition are not related to the coloring matters of the blood or of the bile.

If the filtrate from the *urochrome* iron precipitate is concentrated, it yields bulky crystals which may be purified by recrystallization from alcohol. These consist of an alkaloid, *uro-theobromine*, isomeric with ordinary theobromine. It sublimes without change, forms no crystalline precipitate with silver nitrate, and displaces acetic acid from cupric acetate, forming an insoluble compound.

Creatinine is also present, and the mother-liquor from the creatinine contains three alkaloids. *Reducine*, $C_{12}H_{22}N_6O_9$, or $C_6H_{11}N_3O_4$, forms a barium compound which is almost insoluble in alcohol. Neutral or acid solutions of *reducine* reduce ferric, cupric, or mercuric salts to ferrous, cuprous, or mercurous salts respectively, and silver salts to metallic silver. *Para-reducine* unites with zinc oxide to form a compound, $C_6H_9N_3O \cdot ZnO$ or $C_6H_9ZnN_3O_2$. *Aromine* could not be isolated in a pure condition. When heated, it gives off an aromatic odor resembling that obtained from tyrosine under similar conditions.

Toxicity of the Exhaled Air.—At the *Soc. de Biologie (Brit. Med. Jour.)*, M. M. Brown-Sequard and d'Arisonval reported on some recent experiments concerning the toxicity of the air exhaled from the lungs of man or of mammals. They assert, first, that the air exhaled nearly always contains ammonia; secondly, this air contains in very minute quantities, organic matter which, if not already putrefied on leaving the broncho-pulmonary passages, has a great tendency to rapid alteration, even at a low temperature; thirdly, confined air charged with pulmonary exhalations is extremely noxious, even when containing 1 per cent. of carbonic acid, with a corresponding diminution of oxygen.

DETECTION OF ALKALOIDS AFTER DEATH.

BY DR. PELLACANI.

In a recent number of the *Rivista Sperimentale di Freniatria e di Medicina Legale*, Dr. Pellacani gives an account of some experiments which he made for the purpose of determining how long various poisonous substances resist putrefaction. It is obvious what an important bearing this question may have in medico-legal cases. The following was the method adopted:—A fixed quantity of the poison having been introduced into a definite quantity of blood, the mixture was allowed to putrefy under favorable conditions of temperature. From time to time it was tested for the poison, the same method being carefully employed in each case. Physiological tests were used in the case of such substances as atropine, physostigmine, curarine, etc., and in other cases methods giving characteristic reactions were employed.

The poisons experimented with were for the most part vegetable alkaloids, which were introduced in a free state in the following proportions relatively to the blood:—0.10 in the case of physostigmine, atropine, pilocarpine, daturine, and digitalin, and 0.50 in the case of all other substances.

In this way Dr. Pellacani found that no trace of digitalin or santonin could be found in the putrid liquid after four months, while atropine, daturine, and physostigmine took thirteen months to disappear; at the end of that time there was still a trace of codeine. Morphine and picrotoxin gave signs of their presence after twenty-seven months; aconitine and cicutine were still present in considerable quantities after thirty-four months, and veratrine was found at the end of thirty-nine months. As regards curarine it remained unaltered for twenty-eight months; but after thirty-nine months the physiological test gave a negative result, although the characteristic reaction still persisted, except with the sulphuric acid test. Dr. Pellacani considers that these experiments prove that putrefaction is not so rapidly destructive of vegetable poisons as has hitherto been believed. This is particularly the case with alkaloids.—*Brit. Med. Jour.*, July 21, 1888, p. 152; *med. chronicle*, Sept.

To the foregoing abstract of Dr. Pellacani's paper may be added the results of researches on colchicine, by Dr. N. Obolonski (*Viertelj. f. ger. med.*, Jan. 1888), who found, that colchicine, when present in small quantities (5 mgrms. in 500 grms. of organic substance) can be

recognized with certainty. The alkaloid is of greater stability, and is not liable to decomposition even when mixed with organic substances in an advanced stage of putrefaction. The usual chemical processes for isolation do not produce any changes in the alkaloid. The best reagents for the detection of colchicine are—nitric acid, which gives a violet color, and a mixture of nitric and sulphuric acids, which give a green, changing to dark blue, violet, and yellow. Of these, nitric acid is the best.

A NEW CONSTITUENT OF LIVER OIL.¹

By H. MARPMANN.

The author states that by washing liver oil with 95 per cent. alcohol he has obtained a peculiar substance, which is easily soluble in water, and insoluble in alcohol, ether and benzene. According to the age and color liver oil dissolves more or less readily in alcohol; but even when sixty parts of alcohol are used to one part of oil a perfect solution is not obtained, there being always a residue of insoluble fat acids, which are dissolved by hot alcohol and by ether, but not by cold alcohol. As the substance in question is somewhat soluble in hot alcohol, the last traces of the insoluble compounds were washed out by means of cold alcohol, and the material worked upon was not the solution of oil in alcohol but the portion washed out of it on account of its insolubility.

This insoluble residue after repeated shaking with alcohol, was mixed with water and filtered. The portion soluble in water was, however, so small that the author is only able at present to give the general reactions of the aqueous solution. It had a faintly acid reaction, rotated polarized light to the left, gave with lead acetate and with tannic acid a slight turbidity, and was not altered by potassium ferrocyanide. A dilute solution gave with ferric chloride no reaction, but a concentrated solution assumed with it a dark yellow color, which upon boiling became blood red, and again yellow upon cooling. The solution upon boiling was not changed by strong nitric acid, ammonia, or potassium hydrate. On the other hand it reduced alkaline copper solution. Upon mixing the solution with orcin and hydrochloric acid in a porcelain dish, and evaporating on a water-bath to dryness there re-

¹From the *Pharmaceutische Centralhalle*, August 23, reprinted from *Phar. Jour. and Trans.*, Oct. 13, p. 288.

mained a brown residue, having a metallic lustre. This dissolved in alcohol with a dark brown color, and the solution was colored gray-brown by ammonia. By this last reaction this constituent of liver oil soluble in water is distinguished from varieties of gum, since gum gives with orcin a green residue, that dissolves in alcohol with a greenish-yellow color, and this solution when treated with ammonia is colored yellow, with a tinge of greenish violet.

According to the rotatory power of the new substance and its behavior, towards Fehling's solution it might have been supposed to be gum, or an albuminoid or a sugar. For its qualitative distinction from any of these compounds the author found the orcin test most suitable, and he therefore describes the reaction somewhat in detail.

Orcin is the chromogen of various coloring matters, and is obtained from species of *Rocella* and *Variolaria* by boiling with milk of lime, and extraction of the neutralized and evaporated filtrate with alcohol from which it crystallizes out in colorless crystals. The orcin is freely soluble in water, and is readily altered on the addition of hydrochloric acid. Upon evaporating such a solution on a water-bath the residue is of a beautiful red color; this residue dissolves in alcohol with a rose color, which is changed to a very beautiful violet upon the addition of a few drops of ammonia solution. Small quantities of organic substances modify these color reactions very considerably, so that orcin constitutes an important reagent for such bodies, especially for carbohydrates.

Constant colorations are also obtained upon boiling a dilute solution of a carbohydrate with an equal volume of hydrochloric acid and about one per cent. of orcin, and afterwards adding alcohol and ammonia. But these reactions do not take place so smoothly as those obtained when evaporation is practised.

The author prepared a solution of one gram of orcin in 100 cc. of pure hydrochloric acid, of which he placed about 0.5 cc. upon a porcelain dish, then added about an equal quantity of the substance to be tested, and evaporated upon a water-bath. As soon as this small quantity of liquid became warm the color reaction began, the evaporated layer becoming colored at the margin. When it was dry alcohol was added, which dissolved the residue more or less completely. This alcoholic solution had a constant color for each substance, which upon the addition of a few drops of ammonia solution was altered more or less. Strong oxidizing agents, such as nitric acid, give very strong

colorations with orcin, on which account such additions are to be avoided.

In the following table the color reactions of orcin with various substances tested are described :—

	Evaporation residue.	Solution in Alcohol.	Addition of Ammonia.
Gum Arabic.....	Green	Green-yellow	Green-yellow violet.
Gum Tragacanth.....	Green-black	Green-yellow	Brown.
Gum Senegal.....	Greenish-blue	Green-yellow	Green-yellow.
Potato Starch.....	Red	Light-brown	Violet-yellow.
Maranta Starch.....	Red	Brown	Brown.
Triticum Starch.....	Yellow red	Light-brown	Brown.
Milk Sugar.....	Brown-red	Yellow-brown	Greenish-brown.
Beet Sugar.....	Brown	Yellow-brown	Brown.
Cane Sugar.....	Brown	Yellow-brown	Brown.
Gelatin.....	Red	Yellow-red	Violet.
Pepsin.....	Yellow	Yellow	Dark-yellow.
Pancreatin.....	Brown	Light-brown	Rose-violet.
Albumen, fresh.....	Yellow-brown	Light-brown	Brown.
Albumen, boiled, dissolved in Pepsin.....	Yellow	Light-brown	Brown.
Albumen, boiled, dissolved in Pancreatin.....	Brown	Light-brown	Brown-violet.
Residue from alcoholic solu- tion of Liver Oil.....	Brown	Light-brown	Brown green.
Pure Orcin.....	Red	Rose	Violet.

According to this comparison the residue from liver oil showed most resemblance to pancreatin and albumen that had been dissolved by pancreatin. This suggested the idea of seeking the new substance in fresh pancreatic liquor.

Fresh aqueous pressings from pancreas glands were precipitated with alcohol, the precipitate washed with alcohol, then dissolved in water, and again precipitated, washed and redissolved in water. The resulting solution rotated a polarized ray to the left and reduced alkaline copper solution. By evaporating over sulphuric acid a non-crystalline residue was obtained. It was therefore considered probable that the two substances from liver oil and pancreatic juice were identical, and this assumption was made tolerably certain by a comparison of the influence of the two substances upon fixed oils. A few cubic centimetres of the solutions mixed with any of the fatty oils acted so that the oil could be temporarily emulsified with half its volume of

water, and after several hours the oil did not separate pure, but with a somewhat milky turbidity.

The author states that he has found this new substance in all the samples of liver oil examined, both in the white oils and in the darkest varieties, from the most diverse commercial sources. He thinks it might be present in fresh livers in larger quantity, since liver oils deposit a quantity of mucus upon standing. But at present he has not examined any perfectly fresh oils and cannot therefore speak with certainty upon this point.

LARD ADULTERATION WITH COTTON-SEED OIL.

The September number of the "Analyst" contains communications on the above subject by A. H. Allen, Otto Hehner, Rowland Williams, E. W. T. Jones, W. F. K. Stock and Prof. J. Campbell Brown, which are condensed into one article in the following. As they do not agree as to the value of the various tests, under each test is given the mode of procedure followed by its advocate.

1. *Saponification equivalent*, owing to the nearly alike value of lard and cotton-seed oil, is of little use, except in occasional cases, to denote the presence of other adulterants, as cocoanut oil, said to be sometimes used.

2. Melting-point is no criterion as to its freedom from adulteration, depending on the part or parts from which the fat is obtained.

3. *Specific gravity* allows of no very definite conclusions, but is of value in case beef stearin is present with the cotton-seed oil. Lard has the sp. gr. 0.861, beef stearin 0.862, and cotton-seed oil 0.872, at 100°C.

4. *Sulphur monochloride*, S_2Cl_2 , 5 gm. melted lard are put in a small porcelain dish, and just before setting 2 cc. of a mixture of equal volumes of S_2Cl_2 and CS_2 added, the mixture well stirred at first, and then occasionally, for the first fifteen minutes, without application of heat. Genuine lard only *thickens*, or perhaps becomes *rather stiff*, in three hours, an appreciable amount of cotton-seed oil will cause it to become *hard and solid* in half this time. This test is very simple, but with practice one can with a certainty pick out all lards containing cotton-seed oil.

5. Salkowski has shown that animal fats contain a small quantity

of cholesterin, and that vegetable fats contain phytosterin. Fifty gm. of fat is saponified with alcoholic potash, the soap well shaken out with ether, the ether distilled off, the residue once more treated with alcoholic potash and ether, and the residue dissolved on a watch-glass in a few drops of hot alcohol. The long needles of phytosterin obtained in the presence of a vegetable fat melt at $132^{\circ}\text{C}.$, and treated with chloroform and sulphuric acid form a bluish solution. Cholesterin crystallizes in flat tablets, melts at 146° , and with the above test gives a red solution. The difference of color is strongly marked if the solution is allowed to stand in a corked test tube for several days.

6. *Maumené's test.*—Used as a quantitative test but to succeed the lard must first be entirely deprived of moisture by heating over a Bunsen burner. 50 gm. of pure lard with 10 cc. strong sulphuric acid, show a rise of from 24 to $27.5^{\circ}\text{C}.$; cotton-seed oil of about $70^{\circ}\text{C}.$ In every case a lard which reduces silver shows a rise higher than 27.5° , the increase being proportional to quantity of cotton-seed oil.

7. *Iodine-absorption.*—A reliable test in the absence of stearin; which is added to lard heavily adulterated with cotton-seed oil, to counteract the softening effect of the latter. Stearin absorbs much less iodine than cotton-seed oil, therefore the addition of a large percentage of stearin reduces the iodine absorption of the mixture to a greater or less extent; it is rarely, however, that the stearin is present in such quantity as to absolutely nullify the test. American lard absorbs from 60–62 per cent. iodine; English lard appears to absorb less—from 51.5 to 62 per cent.; beef stearin, 21 per cent.; lard oil, fresh, 73–74 per cent.; old lard oil, believed to be pure, 41 per cent.; cotton-seed oil, 105–110 per cent. Some lards examined absorbed as much as 85 per cent., while numerous samples required 70–75 per cent., leaving no doubt of their adulteration with cotton-seed oil.

Weigh about 0.5 gm. of the melted lard into a three-ounce wide-mouthed stoppered bottle, melt the fat by placing the bottle on a water-oven, and when *nearly cool* dissolve the fat by adding 10 cc. chloroform, 20 cc. Hübl's reagent (5 gm. I and 6 gm. HgCl_2 are each dissolved in 100 cc. 96 per cent. alcohol, the solutions mixed and allowed to stand over night before use) are carefully measured into the bottle after it has become quite cold, and set aside for three hours; at the end of this time the color must be decidedly brown, showing excess of iodine, or else the operation must be repeated, using less fat.

The contents of the bottle are poured into a beaker, the bottle is rinsed with potassium iodide solution, and the liquid titrated with $\frac{1}{10}$ normal sodium hyposulphite, which has been standardized with pure iodine just before use. The Hübl's reagent must also be standardized for each set of experiments, and to offset the reducing action of chloroform upon the iodine solution, a quantity equal to that used in the test must be added in standardizing. There is a practical advantage in determining the iodine absorption of the fatty acids instead of the fat, in that the use of chloroform can be dispensed with, owing to the solubility of the fatty acids in alcohol. The fatty acids are best prepared by saponifying the fat with rectified spirit and the saturated aqueous solution of caustic soda, recommended by Wollny for use in Reichert's butter process.

8. *Silver nitrate test.*—This test is considered by all to be characteristic for cotton-seed oil; in its execution various methods are employed. I. Bechi's test¹ contains an amylic alcohol solution of rape oil, which it has been shown can be dispensed with without impairing the delicacy of the test. The simplified reagent is a solution of 1 gm. silver nitrate in 200 gm. alcohol and 40 gm. ether, acidifying by addition of 0.1 nitric acid. To the oil or fat to be examined add half its bulk of the above solution and heat in a water-bath for fifteen minutes. Pure lards always remain perfectly unchanged, cotton-seed oil mixtures blacken more or less quickly. II. Milliau's² modification of the above. III. Stock's process is based on that of Milliau. 15 gm. of the sample are saponified in a 7-inch capsule with a mixture of 15 cc. of a 30 per cent. NaOH solution, and 15 cc. 92 per cent. alcohol by heating the fat to 110° C. and adding the mixture, 1 cc. at a time, with constant stirring. The temperature should not fall below 95° C.; if the operation has been successful, the soap is a smooth, thick paste. Boiling distilled water is added slowly at first until the paste is thinned, then water is added to make 500 cc., in which volume the soap should dissolve completely. 40 cc. dilute H₂SO₄ (1–10) are added and the liquid brought to a boil for 7 to 12 minutes, then kept just below boiling, until the separated fatty acids fuse to a clear, oily layer from which the greater part of the aqueous layer is removed by syphonage; the remainder with the fatty acids is poured into a clean, warm flask with a long and narrow neck. The acids are freed as

¹ AMERICAN JOURNAL OF PHARMACY, 1887, 280.

² AMERICAN JOURNAL OF PHARMACY, 1888, 290.

nearly as possible from the watery layer which is syphoned off, and the flask filled up with boiling distilled water so as to bring the acids into the neck.

5 cc. of the fused, fatty acids are now transferred into a clean, dry, wide test tube by means of a dry, warm, fast-running pipette, 20 cc. absolute alcohol added by pouring through the pipette so as to wash it, the solution heated to incipient ebullition in a vessel of boiling water, and 2 cc. of a 30 per cent. solution of silver nitrate added, when if even 2 per cent. of cotton-seed oil be present in the sample, the characteristic cedar-brown color is at once developed. To quantify this reaction, known mixtures of pure lard and refined cotton-seed oil are treated as above, and the colors in the different tubes compared by reflected light against a white back-ground. This must be done simultaneously, for in about seven minutes the coloring matter begins to fall out, and correct comparison is then impossible.

In this test a blank experiment should be made as "pure" alcohol often reduces silver nitrate to a certain extent.

The following table shows some of the results obtained :

	Omentum Lard, Pure.	Leaf Lard.	English Lard.	American Lard con- taining cotton-seed oil.	Mixture of unknown nature.	Suspected sample.
Original Fat.	Melting point; °C.	39	40	39	37.5	40
	Solidifying point; °C.	{ 26.5 rising to 27.5	32	27	27.5	30.5
	Plummet gravity at 99 °C.	.8602	.8620	.8606	.8648	.8637
	Iodine absorption per cent.	55.4	60.5	62	82.5	68.8
Fatty Acids.	Melting point; °C.	39	39.5		39.5	62.8
	Solidifying point; °C.	{ 38.7 rising to 39.0	{ 38.5 rising to 38.8		{ 37.5 rising to 38.5	
	Plummet gravity at 99 °C.	.8872	.8886		.8450	.8886
	Mean combining weight	274.5			278.8	
	Iodine-absorption per cent.	58.8	65.3		70.4	64.8
	Oleic acid, etc. per cent.	58.4			57.8	
	Oleic acid, Iodine- absorption	87.4			(94.6)	
	Millian's nitrate of silver test	White.	White.	Grey.	Marked black'ng.	Sensible darkening
					Marked blackening	

The following figures are the recorded results of experience with 1 tallow, 2 lard, 3 and 4 cotton-seed oil, 5 fatty acids from 4 and 6 cotton-seed fat, a commercial product which is the *stearin* of cotton-seed

oil, the *ordinary* cotton-seed stearin of commerce is the stearic acid from cotton-seed oil.

	1	2	3	4	5	6
	Tallow.	Lard.	Cotton-	seed oil.	Fatty acids from 4.	Cotton-seed fat.
Original fat.						
Melting point; °C.....		{ 28			35	40
Solidifying point; °C. {	33	45			32	31 rising to 32.5
	48					
Plummet gravity at 99°C.....	.862	.860 .861	.872	.8725	.8476	.8684
Iodineabsorption, per cent.	40	{ 59 62	106 110	108 110	{ 115.8	89.8
Saponification equivalent ...				285	289	
Acidity (— oleic acid).....				trace	97.6	.84
Fatty acids.						
Melting point; °C.....	45	38	{ 85 86			
Solidifying point; °C.....	48	38	80			
Plummet gravity at 99°C.....			.8467			
Iodine absorption, per cent.	41.8	64.2	115.7			

Lard differs materially in its iodine-absorption from beef-stearin on the one side and cotton-seed oil on the other. There is also a marked difference in the specific gravity of lard and cotton-seed oil, and this difference is also noticeable in the fatty acids. On the other hand, lard and beef-fat are substantially of the same density. This difference is very important, as it would enable one to distinguish a mixture of beef-stearin and cotton-seed oil having an iodine-absorption of about 60, from genuine lard. Thus, while the proportion of the adulterant in a mixture composed of *lard and cotton-seed oil only* can be ascertained with considerable accuracy by determining the iodine-absorption, the estimation will be below the truth if beef-stearin be present. On the other hand, the presence of beef-stearin does not interfere with the deduction to be drawn from the increased specific gravity of the melted sample. Hence this method, though not affording more than approximate results, is calculated to do very good service in conjunction with the iodine-absorption.

Analysts are cautioned by J. Campbell Brown against two errors they are liable to make in trusting the iodine-absorptions published.

1. Liability to underestimate the proportion of cotton-seed oil and other foreign fats in adulterated lard. The substance used by about twenty-five American firms is a mixture of cotton-seed oil and beef-stearin, the residue from the manufacture of oleo-margarine. The iodine-absorption of any mixture that can be used for mixing in large proportions with lard is much lower than that of cotton-seed oil—not

higher, if so high, as between 80 and 90. Now if any one calculates the quantity of cotton-seed oil in mixed lard giving an iodine-absorption of say 76, using 105 as the iodine-absorption of the foreign fat, instead of 90 or under, it is clear that he will greatly under-estimate the quantity of the foreign fat.

2. Liability to condemn genuine lard which is more oily than pork fat or lard rendered in England.

American lard contains as a rule naturally much more olein than English lard. If some of the lard oil has not been pressed out the high iodine-absorption of lard oil—75 to 80—so raises the iodine-absorption of the thin oily lard, that an analyst judging mainly from the iodine-absorption would infer the presence of cotton-seed oil where there was only an excess of lard oil. It is necessary, therefore, to be very careful in determining, first the presence of some cotton-seed oil by safe qualitative tests before determining the iodine-absorption; and, further to take into consideration the consistence of the sample and to attend to tests for beef-stearin.

Allied Notes.—Mr. Fox recently found fifty per cent. of earth-nut oil in lard oil, detecting it by the altered sp. gr. and the presence of *arachidic acid*.

Bechi's test can be used to detect the presence of margarin which almost invariably contains cotton-seed oil, in butter which, if pure, will not reduce the silver solution.

F. X. MOERK.

ON GUAIACOL.

By D. J. LEECH.

CREASOTE is a composite substance containing various constituents, of which guaiacol, or catechol (pyrocatechin) monomethyl ether $C_6H_4 \begin{cases} OH \\ OCH_3 \end{cases}$ is the most important, 60 to 90 per cent. of beech wood creasote consisting of this ether. The specimens of creasote sold for medicinal purposes are by no means uniform as regards their composition, and, not unfrequently, so-called creasote consists chiefly of carbolic acid.

Guaiacol is a highly refractive colorless liquid, with an aromatic smell, slightly soluble in water, readily so in alcohol and fixed oils. The statements made by Sommerbrodt and Fraenkel as to the benefits derived from the administration of creasote in phthisis, led Sahli to try

guaiacol, which has advantages over creasote in that it is of definite composition, and has a less unpleasant taste and odor. Sahli prescribed it thus:—

R. Guaiacol puriss	15 to 30 minims.
Aq. destill.....	6 ounces.
Sp. vin. rect.....	6 drachms.

A teaspoonful to a tablespoonful, two to three times a day after food, in some water.

The solution should be kept in a colored bottle, as exposure to light causes the deposition of a resinous substance.

H. Sahli (*Cor.-Bl. f. Schweiz. Aerzte*, 1887, XVII., 616, 622,) likewise administered the guaiacol in cod liver oil. He found it improve appetite, loosen and diminish expectoration, besides ameliorating general discomfort and relieving pain.

M. Schüller (*Wien. med. Presse*, 1887, No. 50,) caused his phthisical patients to inhale the vapor of a watery solution of guaiacol, and gave, in addition, extract of guaiacum wood in pills. He states that his patients improved under this treatment.

Fraentzel (*Deutsche med. Woch.*, 1888, No. 7, p. 138) has used guaiacol in more than a dozen cases. He considers it the active constituent of creasote, and recommends the following formula:

R. Guaiacol.....	3½ dr.
Tr. gent.....	1 oz.
Sp. vin. rect.....	8 oz.

Vin. Xerici q. s. ad O i.

One tablespoonful, two or three times daily, in a wineglassful of water. He strongly advocates its use.

J. Horner (*Prag. med. Woch.*, 1888, No. 17) says he has employed guaiacol for four years at the General Hospital at Zwickau in the treatment of tuberculosis. He gives it in pills containing about three-fourths of a minim, commencing with one thrice daily after food, and gradually increasing the number of pills to ten in a day. Under this treatment, combined with careful diet and hygienic precautions, he thinks he has seen complete cures of cases of phthisis when far advanced, and improvement even in those of long standing. In many cases the appetite improves, the bacilli decrease, the cough and fever and expectoration diminish; night sweats disappear, and the patients improve in strength. In some cases no distinct effect follows, but the drug never produces any untoward results. Most patients take it very well, and only a few object to it.—*Med. Chronicle*, Sptb., 1888.

PHARBITIS TRILOBA AS A SOURCE OF "JALAP."

In the second part of Vol. I of the "Mitteilungen aus der medicinischen Facultät der kaiserlich Japanischen Universität," published at Tokio, M. K. Hyrano discusses the value of this species, a native of Japan, for medicinal purposes. He states that the purgative properties of the official species of convolvulaceæ are due to the presence either of convolvulin $C_{31}H_{50}O_{16}$ or of orizabin $C_{34}H_{56}O_{16}$ (jalapin of W. Meyer). The drugs used in commerce are jalap root, orizaba root, scammony root and turbit root. Jalap root contains convolvulin, but that of *Ipomœa Orizabensis* jalapin, which has a homologous composition with convolvulin, but differs from it by its solubility in ether and chloroform. Scammony root also contains orizabin; the resin contained in turbit root appears to consist at least partially of the same substance as that of orizaba root. The purgative properties of the seeds of *Pharbitis Nil* are due to convolvulin. The native name of *Pharbitis triloba*, of Japan, is "asagawo," and its seeds have long been used as a purgative under the name "kengashi."

A full botanical description of the plant and, in particular, of the seeds, follows.

To extract the active principle, 400 grams of the finely-powdered seeds were twice boiled in alcohol of 90 per cent., filtered, and the pure filtrate decomposed by acetate of lead. The liquid filtered from the lead precipitate, after removing the excess of lead by sulphuretted hydrogen, was evaporated in the water-bath, by which a resinous mass was obtained. This was kneaded in warm water in order to rid the resin from its soluble impurities; and it was further purified by again dissolving in alcohol and precipitating by water. The resin thus finally obtained in the water-bath weighed 27 grams. It was a brittle friable substance; ether extracted from it 10.3 per cent. of almost pure oil. The portion remaining insoluble in ether gave all the reactions of convolvulin. The pure resin was easily soluble in alcohol, but insoluble in bisulphide of carbon or chloroform; after treatment with dilute hydrochloric acid it reduced alkaline copper solution. Like convolvulin, it exhibited the chemical properties of a glucoside, splitting up, under the action of mineral acids, into sugar and convolvulinic acid $C_{15}H_{25}O_8$, which forms a crystallizable salt with barium, soluble with difficulty in water, but readily in alcohol.

The author concludes that the resin obtained from *Pharbitis triloba* may be used officinally in the place of resina jalapæ.—*Phar. Jour. and Trans.*, October 6, p. 270.

ON THE ACTION OF THE ROOT OF APOCYNUM CANNABINUM.

By DMITRY A. SOKOLOFF.

The North American plant *Apocynum cannabinum* belongs to the natural family *Apocynaceæ*, which has already supplied us with a series of cardiac poisons and powerful remedies (*Strophanthus hispidus*, *Tanghinia venenifera*, *Vinca major*, *Thevetia neriifolia*, *Nerium Oleander*, etc.). While the apocynum root is official in the United States of America, it remains still very little known in the Old World. In view of this circumstance, Dr. Sokoloff has undertaken an experimental enquiry into the biological action of the drug in Professor S. P. Botkin's clinical laboratory in St. Petersburg. The experiments consisted in the intravenous injection of an aqueous infusion of the root (eight grammes to 100 cc. of water) into various warm-blooded animals, the single dose of the infusion varying from three to ten cubic centimetres. The chief outcome of Sokoloff's researches may be condensed thus:—

(1) The drug produces a very pronounced retardation of the cardiac action, with a very considerable enlargement of the pulse wave and a marked rise of the blood tension.

(2) The initial retardation of the heart is followed by an acceleration of the cardiac action, while the arterial pressure ascends still further.

(3) The cardiac retardation (first stage) is caused by an irritating action of the drug, both on the central and peripheral inhibitory apparatuses.

(4) The subsequent acceleration (second stage) is not dependent upon anything like paralysis of the inhibitory apparatuses, since the injection of another dose of the infusion can again give rise to a retardation of the heart's work.

(5) On the injection of a very large dose, the two stages are followed by a third one, which is characterized by cardiac arrhythmia, the appearance of Traube's waves, and a gradual fall of the blood pressure down to 0.

(6) The rise of the blood tension during the first and second stages is dependent not only upon the stimulation of the vaso-motor centres in the medulla oblongata, but also (and that in a very considerable degree) upon the excitation of the spinal vaso-motor centres.

Moreover, the heart and blood vessels themselves take a certain active part in the causation of the rise.

(7) Both the central and peripheral vaso-dilatory apparatuses remain wholly intact.—*Med. Chronicle, Sptb.*, 1888; *from Ejened. Klin. Gaz.*, 1888, Nos. 25, 26.

FREEZING MIXTURES CONTAINING SOLID CARBONIC ANHYDRIDE.¹

BY L. CAILLETET AND E. COLARDEAU.

The temperatures were measured by means of a thermoelectric couple which had been graduated against a hydrogen thermometer.

Compressed or porous solid carbonic anhydride alone, under atmospheric pressure, gives a temperature of about -60° ; in a vacuum maintained by means of a pump and potash the temperature is -76° . A mixture of ether and solid carbonic anhydride has a temperature of -77° under ordinary pressure, and -103° in a vacuum. This mixture solidifies liquid carbonic anhydride.

When solid carbonic anhydride is added to ether, it at first disappears rapidly, not owing to volatilization, but because it dissolves in the ether. The ether remains transparent, but after some time bubbles of gaseous carbonic anhydride are given off. If further quantities of the anhydride are added, the liquid becomes saturated, and loses its transparency. The temperature gradually falls until it attains a minimum exactly at the point of saturation. Any further addition of the anhydride causes no further reduction of temperature, but the liquid becomes more and more turbid. It is evident that the effect of the ether is due to its solvent action on the carbonic anhydride. Other solvents producing low temperature with the anhydride are methyl chloride, -82° ; sulphurous anhydride, -82° ; amyl acetate, -78° ; phosphorus trichloride, -76° ; alcohol, -72° ; and ethylene chloride, -60° . The temperature of mixtures of carbonic anhydride with methyl chloride or sulphurous anhydride in a vacuum is so low that the solvent solidifies, and the temperature of the mass remains constant from this point. With methyl chloride the temperature obtained is -106° . A mixture of carbonic anhydride and chloroform becomes solid under ordinary pressure, and has a temperature of -77° .

¹ *Compt. Rend.*, cvi, 1631—1634; reprinted from *Jour. Chem. Soc.*, October, p. 1025.

SOLUBILITY OF MAGNESIUM AMMONIUM PHOSPHATE IN ALCOHOL.¹

BY A. J. WAKEMANN.

The author mentions that Rose, in the sixth edition of his *Handbuch der Analytischen Chemie*, points out that the precipitate of magnesium ammonium phosphate is entirely insoluble in water containing one-fourth of its bulk of ammonia solution of specific gravity 0.96, and that under the determination of phosphoric acid by magnesium salts, Rose states that water containing 3 per cent. of ammonia gas dissolves only traces of the precipitate, and that this solubility is reduced to less than half if to the dilute solution of ammonia one-fourth of its volume of alcohol is added, and, further, that the addition of alcohol favors the separation of the precipitate.

The author, in order to test the method, which he says appears to have been neglected by analysts, has made a series of comparative analyses under identical conditions with the exception that some of the precipitates were washed with ammonia solution, according to the ordinary method, and the remainder with ammonia solution containing alcohol.

The results of his experiments point to a slight advantage in the use of alcohol in diminishing the solubility of magnesium ammonium phosphate when the precipitate is somewhat bulky. The use of alcohol, moreover, appears to make the precipitate more compact, so that it is more easily washed, and is less liable to creep up the sides of the funnel. The addition of alcohol to the solution in which the precipitation takes place is not advantageous, as it causes the precipitate to attach itself more closely to the beaker, so as to be difficult of removal, and it also retards the filtration.

VARIETIES.

Caustic Pencils are made by De Sinéty (*L'Union méd.*, March 17) of crystallized phenol 0.05, tannin 4.0, glycerin 5 drops, and sufficient tragacanth.

Unguentum Calcii chloridi, prepared as follows, is used by Dr. Lier (*Monatsh. f. pr. Derm.*) in eczema: Ung. zinci 20, talc. 5, ol. cadinum 5, calcii chloridum 2, and water 10 gm.

¹ *Technology Quarterly*, Boston, i, 173—177; reprinted from *Jour. Chem. Soc.*, October, p. 1131.

Silicofluoride of sodium as an antiseptic.—After an extensive and varied trial of *salufer*, Dr. Robson (*Brit. Med. Jour.*, May 19), has arrived at the following conclusions:

1. "*Salufer*" is an efficient antiseptic.
2. The powder is a strong irritant, even acting as a caustic if dusted on a raw surface.
3. A solution of one grain to an ounce of water is quite strong enough for ordinary purposes, being apparently unirritating in that strength.
4. A solution of ten to twenty grains to a pint (imperial), may be safely used to syringe out closed cavities.
5. The solution is unirritating to the hands.
6. The solution acts on the glaze of porcelain after long use, and corrodes steel instruments, but sponges are unaffected by it. The addition of bicarbonate of sodium to the solution of "*salufer*" diminishes its action on steel.
7. A very convenient and comfortable antiseptic poultice may be made by soaking Gamgee tissue or absorbent wool in a hot solution (ten grains to the pint), wringing it free of excessive moisture, applying it to a wound, and covering with gutta-percha tissue.
8. Although for ordinary surgical work he will still employ perchloride of mercury, in all cases where there is danger of absorption, as in syringing out cavities, he will employ "*salufer*."
9. "*Salufer*" will prove to be of great use to obstetricians, it being both safe and efficient.
10. It acts very efficiently as a deodoriser to the hands.

Amylene Hydrate.—Dr. Lares (*Med. News; Berl. klin. Woch.*, May 21, 1888), presents the following conclusions:

1. Amylene hydrate is a very useful hypnotic, which may be given in two or three times as large a dose as chloral hydrate.
2. It operates somewhat less certainly than chloral hydrate and morphine.
3. Unpleasant accidents (excitement, slight drunken-like stupor) were very seldom observed. Grave accidents were never observed.
4. A tolerance, relative to diminution in efficiency, was not noticed within three months.
5. The deep and refreshing nature of the sleep obtained was praised oftener than in the case of any other sleep-producing means.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, OCTOBER 16, 1888.

The first meeting of the present series of meetings was held this day, and was organized by calling Mr. Wm. B. Webb to the chair. The minutes of the last meeting having been published in the *AMERICAN JOURNAL OF PHARMACY*, it was moved that the reading of them be dispensed with.

The actuary reported that Mrs. Mary Wayne had presented quite a number of valuable books which formed part of the library of the late Prof. E. S. Wayne, and that he had returned the thanks of the College for her kind consideration. On motion of the curator the thanks of the College were also voted to Messrs. Hance Brothers & White, for a collection of powdered extracts presented to the museum of the College.

Mr. Joseph W. England, Ph.G., read a paper upon permanent *syryp of iodide of iron*. Prof. Maisch stated that honey was originally suggested for the preservation of iodide of iron, and that the solution of ferrous iodide as prepared many years ago, was protected by honey. Mr. Webb said that it was so when he commenced learning the drug business. Prof. Maisch stated this agreed with the proposal of Mr. England, as honey consists in part of glucose. Before the theoretical suggestions of the paper were accepted, they should at least in part be verified by experiment and analysis. He had always found the precipitate occurring in the syrup, to retain some iodine even after prolonged washing, and the aqueous solution of ferrous iodide he thought had an acid reaction. Mr. England said he had not tested it before the addition of the sugar. Mr. Beringer said that he had seen some samples of syrupy glucose which were very acid from sulphurous acid used in decolorizing it, and that some of these samples were so strongly contaminated that the character of the acid was easily recognized by its odor.

Mr. Beringer read a paper upon an adulteration of *ground elm bark*; the bark was thought to be of western production. Both of these papers were referred to the publication committee.

Mr. Moerk read some extracts from a paper by a German apothecary, M. Marpmann, upon *fat absorptions and a new substitute for cod liver oil*; the statement that cod liver oil owes its therapeutic value to the presence of free fatty acids has been frequently made and it has been noticed that the pale or bleached oils are less tolerated than those having a yellow or light brown color. The quantity of free acid calculated as oleic acid varies from .2 to 4 per cent.; lard, when fresh, varies from 1 to 1.52 per cent., and old lard contains at times as much as 6 per cent. All the facts make it quite unlikely that the assimilation is in ratio to the acids present, and the chemical conditions and physiological considerations render it quite improbable. The pancreatic ferment decomposes the fats and the bile emulsifies the acids as such or after combination with bases, which then are in this condition assimilated. Chemical changes do not take place in the fatty acids when fats are decomposed; the acids are deposited as such and there is no reason why an acid fat should exhibit different reactions under pancreatic ferments to those shown by a neutral fat. The rapidity of the change seems to be owing to the potency of the fermenting principle; and it has never yet been shown why cod liver oil is more medicinally active than other oils. Fluid fats seem to cause more difficulty in digestion than solid ones and it is probably because they coat the food with a layer that is impenetrable to the gastric juice, and some fats cause less disturbance to the functions of the stomach and are consequently easier of digestion.

Artificial gastric juice when digested with different oils shows quite dissimilar results. With cod liver oil it gives a transient mixture, then separates into an emulsified fat layer, and only becomes clear through half its volume. The oils of olive, rape, flaxseed, ground nut, hemp, poppy, and benne, when similarly treated, separated at once, and castor oil emulsified slightly—and all the oils gave a slightly acid reaction after twenty-four hours and traces of glycerin were observable in the aqueous solution. It would seem as the sum of these experiments that cod liver oil differs from the other fats because of its easy miscibility with the gastric juice, and then the pancreatic secretion can act on the finely divided mixture, while other fats remain in large globules and are not easily acted on.

Two preparations have been proposed to be substituted for and improvements on cod liver oil.

Liparin, which is olive oil with a small percentage of free oleic acid.

Fat peptonate, a mixture of cod liver oil, or pure olive oil acted on by the pancreatic secretion.

Four other preparations were made to compare results with liparin, viz.: Olive oil with 5 per cent. of pure phosphoric acid; olive oil with 5 per cent. lanolin; olive oil with $\frac{1}{2}$ per cent. sodium oleate; and olive oil with 1 per cent. mucilage of gum arabic.

Liparin when treated with artificial gastric juice mixes fairly at first, but separates in a few minutes nearly pure. Fat peptonate, under same treatment mixes, and after 24 hours still is free from oil globules; olive oil with half per cent. oleate of sodium is the only other one that remains mixed; the inference from all these experiments is that pure fluid fats should be avoided, and that natural foods in which the fats are divided should be the type of such remedies.

The reading of these extracts elicited remarks from several present. Mr. England said that a French house was making a preparation called morrhual, to be used as substitute for the pure oil; and Dr. Lowe said that in the French hospitals the oil was given with the food in place of butter.

Mr. Brown said that he had lately examined *gum arabic* which proved to be adulterated with dextrin, and *lycopodium* that was mixed with at least fifty per cent. corn starch.

Mr. Boring stated that at a meeting of the State Pharmaceutical Association held in June 1887, Mr. England read a paper on a *solution of carmine* suitable for coloring purposes in pharmaceutical preparations; and that in making a similar preparation he found when he had evaporated it till a rod moistened with hydrochloric acid showed no ammoniacal vapor that the carmine was precipitated in globules through the solution, and thought that there was some fault in the process. Several members said that the cause of this precipitation of color was doubtless the destruction of the combination by removing too much ammonia and that more careful manipulation and a lower temperature in evaporation would obviate this trouble.

There being no further business, on motion the meeting adjourned.

T. S. WIEGAND, Registrar.

PROCEEDINGS OF STATE PHARMACEUTICAL ASSOCIATIONS.

The *Dakota* (Northern District) *Pharmaceutical Association* held its annual meeting in Jamestown August 7th and 8th. Vice-president Siegfried presided. Mr. Allen welcomed the Association in an appropriate speech. Reports were received from the secretary, treasurer, and the several committees. Among the work inaugurated at this meeting is the revision of the territorial pharmacy law, for which purpose a committee was appointed charged with consulting with a similar committee of the South Dakota Association and with the Pharmacy Board, and with presenting to the next legislature suitable amendments to the law. The following officers were elected for the ensuing year: C. N. Valentine, La Moure, president; D. F. Siegfried, Sanborn, and C. P. Trepanier, Grand Forks, vice-presidents; H. L. Hausamen, Grafton, secretary, and E. C. Maxey, Fargo, treasurer. The next meeting will be held at Fargo, at a time to be named by the Executive Committee.

The *South Dakota Pharmaceutical Association* met in Huron, August 25th, President Branch in the chair, and was welcomed by Mayor Rice. Besides the president's address and the reports of other officers and committees, several papers claimed the attention of the meeting, the subjects being the use of powdered opium in the preparation of the tincture; the preparation of tinctures and wines from fluid extracts; the keeping of poisons; physicians dispensing vs. pharmacists prescribing; and the renewal of prescriptions. Amendments to the pharmacy law were discussed, and a committee was appointed to act in conjunction with a similar committee from the North Dakota Association. The officers elected are: W. S. Branch, Parker, president; C. Burch, Huron, and N. G. S. Marie, Frankfort, vice-presidents; I. A. Keith, Lake Preston, secretary; D. T. Dunning, Sioux Falls, treasurer, and B. F. Stearns, local secretary, for the next annual meeting, to be held at Aberdeen, on the third Tuesday of August, 1889.

The *Illinois Pharmaceutical Association* assembled in Peoria at its ninth annual meeting, August 21st to 23d; President H. Smith in the chair. Mayor Warner extended the hospitalities of the city. The president presented his annual address, and the secretary and treasurer their annual reports. Reports were also received and properly disposed of from the Board of Pharmacy and from the various committees. Regarding the report on the revision of the Pharmacopoeia it was referred to a committee with the view of ascertaining, by means of a series of questions, the wishes of the pharmacists of the State. A resolution was passed requesting the Board of Pharmacy to rescind the rule requiring two years practical experience in the State before a person could become a candidate for examination; also another resolution in favor of examinations in practical dispensing.

A lengthy report on reorganization with the view of making every registered pharmacist of the State a member, and enlisting his personal participation in carrying out the objects of the Association and of the pharmacy law,

was discussed to a considerable extent, and adopted in its main features, the perfection of the details being referred to a committee consisting of one representative from each congressional district, and of the president, secretary and treasurer of the Association as ex-officio members.

The Board of Trustees of the Chicago College of Pharmacy tendered that college and its property to the State Association for future control and management. After considerable discussion the matter was referred to a special committee for consideration and report.

A number of papers on various subjects were presented and referred.

The officers for the present year are Henry Smith, Decatur, president; W. M. Benton, Peoria, F. C. J. Schackmann, Newton, and F. L. Shinkle, Martinsville, vice-presidents; L. C. Hogan, Englewood, secretary; C. A. Strathman, El Paso, treasurer, and J. O. Christie, local secretary for next year's meeting at Quincy, to be held on the second Tuesday of August.

At a meeting held in Chicago, October 22d and 23d, the special committee on the transfer of the Chicago College of Pharmacy reported to the executive committee; while recognizing the advantages which might be expected to result from the management, by the association, of the pharmaceutical educational institutions of the state, the committee reported adversely to the proposition, because its acceptance would alienate many of the most worthy members, and through a disunited membership would make desired advancement in legislation an impossibility.

The plan of reorganization alluded to above was perfected, in consequence of which the association has now a membership of about 3400 registered pharmacists. Details of the perfected scheme have not been received by the editor.

The *Michigan State Pharmaceutical Association* convened at Detroit, Sept. 4th, while the American Pharmaceutical Association was in session, and on the evening of Tuesday held a joint session with the Section on Commercial Interests of the latter Association. President Bassett presided at the different sessions and presented a suggestive annual address. Reports of various officers and of the several committees were read and acted upon. Among the papers read were the following: Use of Mayer's reagent (see *AMERICAN JOURNAL OF PHARMACY*, Oct. 6, p. 487); adulterated ground elm bark; constituents of buchu; valuation of dialyzed iron; nicotine in cigarettes; assay of tincture of nux vomica; agnin; reactions of aniline colors upon volatile oils, etc. Legislation in regard to patent medicines being required to have the full formula printed on the label of each package was favorably considered.

The officers for the ensuing year are: George Gundrum, Ionia, president; F. M. Alsdorf, Lansing, H. M. Dean, Niles, and O. Eberbach, vice-presidents; H. J. Brown, Ann Arbor, secretary, and William Dupont, Detroit, treasurer.

The following printed Proceedings have been received:

Alabama.—Pp. 33. See July number, p. 375.

Kentucky.—Pp. 60. See July number, p. 376.

Ohio.—Pp. 144. See September number, p. 478.

Texas.—Pp. 59. See August number, p. 427.

PHARMACEUTICAL COLLEGES.

The Colleges of Pharmacy, located east of the Rocky Mountains, have opened their lecture rooms about October 1st, the attendance, as far as we have learned, being equal to, or exceeding that of former years. While it is gratifying to notice the continuous spreading of pharmaceutical education, the necessity for it is doubtless, even at the present time, not as fully appreciated as it should be; for we have learned that the Pennsylvania Pharmacy Board at the examinations held during the early part of October found it necessary to refuse registration to forty out of seventy three applicants; only thirty three of the candidates, or about forty five per cent. were sufficiently prepared for passing the examination. It is evident from such a record, that there must be still a considerable number of aspiring young men, who consider shop routine, perhaps supplemented by a process of coaching or cramming, as being quite sufficient for becoming a pharmacist at the present time.

On the other hand it is likewise gratifying to observe the continually increasing number of those devoting their whole time to study in the laboratories and the lecture rooms of a college, and extending their laboratory work even to the recess between the lecture seasons. The two courses of lectures which are required as the minimum time of study are very frequently voluntarily extended by students to three or four courses, and as a rule to their advantage. Training in the rudiments of science should, wherever possible, precede apprenticeship; but this advantage has usually not been enjoyed by those who have passed through a grammar school, or even through the lower classes of a high school; to them a division of the college labor will always prove of vast benefit, the more so, in case shop duties interfere, more or less, with the study of the subjects presented in the lectures.

The Chicago College of Pharmacy held its semi-annual meeting September 18th, when a large sum was appropriated for the expenses of the institution for the ensuing six months. The committee to whom was delegated the transfer in trust of the Chicago College of Pharmacy to the Illinois Pharmaceutical Association, reported that the tender of the college had been made in due form and received by the Association. A special committee was appointed for the completion of the object. The resignation of Mr. F. M. Schmidt from the Board of Trustees was read, accepted, and Mr. C. S. Hallberg was chosen in his place.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Manual of Chemistry. A guide to lectures and laboratory work for beginners in chemistry. A text-book specially adapted for students of pharmacy and medicine. By W. Simon, Ph. D., M.D., Professor of Chemistry and Toxicology in the College of Physicians and Surgeons; Professor of Chemistry and Analytical Chemistry in the Maryland College of Pharmacy. Second edition. Thoroughly revised and greatly enlarged; with

44 illustrations and 7 colored plates, representing 56 chemical reactions. Philadelphia, Lea Brothers & Co., 1888; 8vo., pp. 479. Price, \$3.25.

The features of the new edition of this meritorious work remain essentially the same as in the first edition. As a matter of course, all the new observations and discoveries made since its first appearance, and which fall within its scope, have been faithfully noticed; but in addition to this, some portions of the principles of chemistry and of the inorganic compounds required amplification, a chapter on quantitative determinations has been added, and the sixth part, treating of the carbon compounds, has been, in part rearranged and reclassified. Nearly thirty well-executed wood-cuts have been prepared for illustrating the text, in addition to those contained in the first edition; and under the heading "Experiment," brief directions are given in the various chapters, intended to aid the student in experimental work. The commendation bestowed upon the work when it made its first appearance, nearly four years ago, we take great pleasure in extending also to the present volume, feeling assured that it will be found a trustworthy guide for the study of chemistry by students of pharmacy and medicine.

The Chemistry of Pharmacy. An exposition of chemical science in its relations to medicinal substances according to a practical and original plan. By R. Rother, graduate of the University of Michigan, Department of Chemistry, etc. Detroit, Mich.: Wm. Graham Printing Company. 1888. 8vo. Pp. 71.

The little volume before us appears to be the forerunner of one devoted to pharmaceutical chemistry, and confines itself mainly to theoretical considerations, which, with the philosophic treatment received at the hands of the author, are presented in a concise but lucid manner. The single chapter of the book is headed, "The Definitions and Methods of Chemistry," and is divided into four sections, respectively entitled: Chemical Principles; Chemical Terminology; Chemical Formulæ, and Chemical Equations. The evolution of the different classes of compounds, their constitution, chemical relation and alteration, etc., etc., are happily explained, and will afford instructive reading to the intelligent pharmacist desirous to make himself acquainted with the foundation upon which chemistry rests, one of the most important branches of pharmacy.

The work is handsomely printed upon good paper, and substantially bound in cloth, and may be obtained from the author at 50 cents a copy, or by mail, 60 cents.

Chemical Lecture Notes, taken from Prof. C. O. Curtman's lectures at the St. Louis College of Pharmacy. By H. M. Whelpley, Ph.G., Professor of Microscopy and Quizmaster of Pharmacognosy and Botany in the St. Louis College of Pharmacy, etc. Second edition, revised and enlarged by the addition of notes on the metals. St. Louis, Mo.: Published by the author. 8vo. Pp. 211. Price, cloth, \$1.50.

In the first edition, these "Lecture Notes" were confined to chemical

physics and to the non-metallic elements; in the present edition they are extended so as to include also the metals, so that the work now embraces the whole range of inorganic chemistry. Of the carbon compounds, usually denominated organic compounds, a few only, with hydrogen, are considered, namely: Marsh gas, acetylene, olefiant gas, and illuminating gas. As indicated by the title, the work is mainly intended to serve the purpose of notes on lectures on the branches indicated, and it serves this purpose very well.

Chemical Experiments for Medical Students, arranged after Beilstein. By W. S. Christopher, M. D., Demonstrator of Chemistry, Medical College of Ohio, Cincinnati. Cincinnati: Robert Clarke & Co., 1888. 12mo. Pp. 84. Price, cloth, \$1.

Beilstein's elementary work for laboratory practice was made available to the American student five years ago, when Professor Curtman of St. Louis translated it, and made many additions, so as to adapt it to the wants of this country. As this work has passed through a second edition, a new version of the original work would scarcely appear to be necessary. The present editor's object was to limit the number of experiments. In our opinion, a more thorough chemical knowledge would be of vast benefit to the medical student.

The text is printed on good, strong paper, and the book is provided with a number of blank leaves for the addition of notes by the student.

Therapeutics; its Principles and Practice. By H. C. Wood, M. D., LL. D., Professor of materia medica and therapeutics, and clinical Professor of diseases of the nervous system, in the University of Pennsylvania. A work on medical agencies, drugs and poisons, with especial reference to the relation between physiology and clinical medicine. The seventh edition of a Treatise on Therapeutics, rearranged, rewritten and enlarged. Philadelphia: J. B. Lippincott Company. 1888. 8vo. Pp. 908. Price, cloth \$6.00.

The lengthy title of the present edition of this work is sufficiently descriptive of its aims and objects. Having been written for the use of the physician, prominence is given, as a matter of course, to physiological action, therapeutic uses, toxic effects, administration and doses, while the pharmacognostical, chemical and pharmaceutical relations of the drugs are necessarily quite briefly mentioned. The arrangement and classification of the material have been described somewhat in detail in notices of former editions; they have been somewhat altered, and as at present adopted seem to be more convenient for consultation. Thus for instance the remedial agents and measures which are not drugs, now form Part I, instead of the last part as heretofore; and of the drugs the general remedies are divided into the three orders, nervines, cardiants, and nutriants, each order being again subdivided into families, corresponding to analogous subdivisions in former issues.

A Textbook of Pharmacology, Therapeutics and Materia Medica. By T. Lauder Brunton, M. D., D. Sc., F. R. S., etc. Adapted to the United States Pharmacopœia by Francis H. Williams, M. D., Boston, Mass. Third edition. Philadelphia: Lea Brothers and Co. 1888. 8vo. Pp. 1261. Price in cloth \$5.50: leather \$6.50.

When a work like this requires the publication of three editions within three years it must possess special merits to secure for it undiminished favor. We have pointed this out on a former occasion, and now reiterate briefly that the systematic arrangement, the precise and correct statements, the clear and exact deductions and directions render it useful alike to the medical student and practitioner, and likewise to the pharmacist. While the latter is not especially—but merely in a general way—interested in general pharmacology and therapeutics, of which the first section speaks upon 500 pages, all the following sections have a direct application to his vocation. Under general pharmacy we find the galenical preparations of the British and United States Pharmacopœias grouped together, with references as to strength and doses. Inorganic materia medica treats of the elements and their medicinal compounds, with the exception of the carbon compounds, which are noticed under organic materia medica, without including the crude vegetable and animal drugs, the two classes being comprised in the last two sections. The copious index arranged in three parts—general, diseases and remedies, and bibliographical—covers 160 pages, and renders every item contained in the book easily available. The present edition will doubtless prove to be at least equal in value and usefulness to those that preceded it. New remedies which promise to be of more than mere transient use, have been embodied in their proper places, and the illustrations have been increased to 230 in number.

Notes on New Remedies. Under this title Messrs. Lehn & Fink of New York publish a periodical, of which No. 5 for October has been received, and which is intended to collect the observations made with newly introduced remedies, and more particularly those which have been obtained by synthesis. These "Notes" will be mailed on request to the publishers.

Guide Book for Distillers and Manufacturers of Arrack, Cognac, Gin, Rum, Cordials, Liqueurs, etc. By E. Sachsse & Co., Leipzig.

Those who wish to learn how French brandy, Jamaica rum, different kinds of whisky, etc., may be prepared from alcohol, and how cider and the different kinds of grape wine may be imitated, will find instructions in this pamphlet. As we regard sophistication as a crime, and imitation—unless sold as such—as a fraud, the formulas contained in this pamphlet are of little use to us.

Bericht von Schimmel & Co. (Gebr. Fritzsche) in Leipzig.

A report on essential oils, the sources of supply, causes of fluctuations in price, etc., information which is valuable for reference.

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Vol. 60

AMERICAN

No. 12

JOURNAL OF PHARMACY.

PUBLISHED BY AUTHORITY OF THE
PHILADELPHIA COLLEGE OF PHARMACY.

Under the supervision of the Publishing Committee, consisting of

HENRY N. RITTENHOUSE, JAMES T. SHINN, CHARLES BULLOCK, T. S. WIEGAND,

AND THE EDITOR

JOHN M. MAISCH.

Price, \$3.00 per Annum,
in advance.

{ Issued in Monthly numbers of
not less than 48 pages.

Single No. } Fourth Series, DECEMBER, 1888. Vol. XVIII., No. 12
30 cts.

CONTENTS.

Some Indian Food Plants. By Henry Trimble.	
1. <i>Shepherdia Argentea</i> , Nuttall	593
Potato Starch and other Starches of Commerce.	
By William A. S. Johnson, Ph. G.	596
On Iris Test Paper. By Wm. G. Greenawalt,	
Ph. G.	598
Note on the Blue Coloring Matter of Flow-ers.	
By the Editor	599
Analysis of Commercial Sodium Bicarbonate.	
By Hermann J. Schroeter, Ph. G.	602
Analytical Notes. Abstract of Theses	606
Pharmaceutical Notes. Abstract of Theses	608
Gleanings from the German Journals. By	
Frank X. Moerk, Ph. G.	610
Abstracts from the French Journals. Trans-	
lated for the A. J. of P.	614
Action of Alkaline Phosphates on the Alkaline	
Earths and other Oxides. By L. Ouvrard	617
The Physiological Action of Borneol. By Ralph	
Stockmann	620
Properties and Uses of Sozodolol. By Leopold	
Larmuth	621
Chemistry of Buchu Leaves. By Y. Shimoyama	624
Kauri Gum Industry. By Ralph Robinson	626
Margosa Oil. By C. J. H. Warden	629
Hydrastine and Derivatives. By E. Schmidt	
and F. Wilhelm	633
Minutes of the Pharmaceutical Meeting	635
Editorial Department	638

NOTICE TO READERS.

This journal is devoted to the advancement of PHARMACEUTICAL KNOWLEDGE and to the advocacy of a MORE THOROUGH EDUCATION and PRACTICAL TRAINING for all persons engaged in PREPARING and DISPENSING medicines, drugs and chemicals.

It embodies a large amount of information EXTREMELY VALUABLE TO APOTHECARIES, DRUGGISTS and PHYSICIANS—comprehending, in fact, a faithful record of the development of PHARMACEUTICAL SCIENCE and INVENTION both in Europe and America, during the period of its issue, commencing with 1829.

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LARGE NUMBER OF FORMULAS, are contained in it, including many which, though not official, are valuable and in use.

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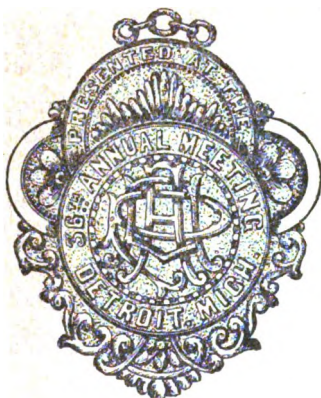
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Pennsylvania Pharmacy Board.

The next examination will be held in January, at Philadelphia. Applicants for examination should apply to the Secretary of the Board, H. B. Cochran, Lancaster, Pa., in December, for the proper blank form of application and the exact date and place of the meeting.



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DEC 11 1888

THE AMERICAN JOURNAL OF PHARMACY.

DECEMBER, 1888.

SOME INDIAN FOOD PLANTS.

A contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

1. SHEPHERDIA ARGENTEA, NUTTALL.

BY HENRY TRIMBLE.

Read at the Pharmaceutical Meeting, November 20th.

In September of this year I was furnished with some fruit of the above plant by Dr. V. Havard, United States Army Surgeon at Fort Abraham Lincoln, Dakota, who also forwarded the following description: "*Shepherdia argentea*, *Nuttall*, (Buffalo berry, Bullberry, the *grains de bœuf* of the Canadians) of the order *Eleagnaceæ*. Branching, spiny shrub generally 5 to 8 feet high but in favorable localities, along streams, becoming arborescent with a stem six inches in diameter and reaching an altitude of 16 or more feet. Rare east of the Missouri River, abundant on this river and thence extending westward to the Sierra Nevada, being common in Oregon, Nevada and Utah. From the Saskatchewan in the British Possessions, it extends southward through Montana, Wyoming and Colorado to New Mexico. Its most congenial habitat is probably the upper Missouri and tributaries through Nebraska, Dakota and Montana. Sometimes it lines the banks of this river for miles together, forming impassable hedges. The leaves are opposite, entire, mostly oblong, 1 to 2 inches long, silvery on both sides and slightly dotted with ferruginous scales; the bluish white foliage contrasting singularly with that of other shrubs. The flowers are dioecious; the male bushes becoming covered with a profusion of small yellow blossoms in April; these have a four-parted perianth and eight stamens alternating with

as many lobes of a thick disk. The female bushes put out their inconspicuous flowers one or two weeks later. The fruit is a red, pellucid berry, three lines in diameter, with a smooth, shining seed; it begins to turn scarlet in July, but is not edible before September, and remains on the bushes until shrivelled by frost.

"The berries grow in such profusion as to cover the stems and twigs to which they are attached by a very short stalk, contrasting charmingly with the silvery foliage, the whole shrub, at this time, being highly ornamental. They are very acid, and hardly palatable until they have been touched by one or two frosts in the early days of October, when they are sweetened and acquire a very pleasant flavor, unlike that of any other fruit.

"Until recently, they constituted one of the staple foods of the Indians, the Utes of Utah, as well as the Sioux of Dakota, or the Blackfeet of the Saskatchewan, who consumed them raw and stewed, or mixed with other native esculents. They still eat enormous quantities of them. The whites are likewise fond of these berries, but use them mostly in the making of an excellent jelly, which is to be found in every household along the Upper Missouri and Yellowstone.

"This jelly has an excellent acidulous flavor *sui generis*. Berries and jelly are very wholesome, and can be freely eaten without the least inconvenience or discomfort.

"Besides being an ornamental shrub of great value the Buffalo berry, with its diffused thorny branches, makes also an excellent hedge plant. It is hardy, stands transportation with great immunity, grows rapidly during the first few years, and is susceptible of any shape by pruning, so that, if female plants only be used, a hedge is obtained of great beauty, strength and durability."

These berries have been mentioned by Dr. Edward Palmer,¹ and by Dr. J. S. Newberry,² but no analysis has been found, and it was thought that a determination of the more important constituents of the fruit might be of interest, particularly for comparison with currants, which they resemble very much. As the composition varies with the ripeness of the fruit, it may be noted that in this sample the berries had become ripe, although they had not been touched by frost, and were therefore quite acid.

¹ Plants used by the Indians of the United States.—*Amer. Jour. Phar.*, 1878, page 543.

² *Popular Science Monthly*, xxxii., page 45.

Petroleum ether extracted from the nearly dry berries a small quantity of fat, with a considerable amount of red coloring matter, which color was further almost completely extracted by ether and alcohol, the latter solvent taking out some acid. As the fat, doubtless, comes from the seeds, it probably exerts but little influence on the value of the berries as a food. The acidity was found to be due to citric and malic acids. The amount of acid was estimated by expressing 10 grams of the fruit, and neutralizing the juice with normal sodium hydrate solution. Whether calculated for citric or malic acid, the results would differ very slightly, so the percentage as malic acid was found to be 2.45.

Moisture and ash were determined in the usual way, and found to be for the former, 71.28 per cent., and the latter, .45 per cent. Nitrogen was determined by combustion with soda lime, which indicated .14 per cent. of albumenoids.

Sugar was determined, both before and after boiling with acid, by the gravimetric method with Fehling's solution, and there was found 2.45 per cent. cane sugar and 3.02 per cent. grape sugar.

The aqueous solution of the berries precipitated by alcohol indicated .42 per cent. mucilage and pectin.

A pleasant acidulous jelly was also made which, in almost every particular, resembled that from currants.

A comparison of the following results with the constituents of currants, as given by Blythe (*Composition and Analysis of Foods*, page 133), may be of interest:

	Buffalo Berries.	Currants.
Water.....	71.28	84.77
Nitrogenous Substances.....	.14	0.51
Free Acid.....	2.45	2.15
Total Sugar.....	5.47	6.38
Other Non-nitrogenous substances (Pectin, etc.).....	.42	0.90
Undetermined.....	19.79	4.57
Ash.....	.45	0.72
	<hr/> 100.00	<hr/> 100.00

Treatment of Warts.—Children often suffer from unsightly warts on the hands, which cannot be removed by caustic. G. B. Pullin, of Sidmouth (*Bristol Medical Journal*), recommends in such cases the administration of two or three minims of liq. arsenicalis twice a day. In a week or ten days, he says, the warts will disappear.

POTATO STARCH AND OTHER STARCHES OF COMMERCE.

BY WILLIAM A. S. JOHNSON, PH. G.

From an Inaugural Essay.

The manufacture of potato starch being an important industry on Prince Edward Island, I visited one of the largest of the factories, situated about fifteen miles from Charlottetown. As is usually the case, it is built on the banks of a stream where a constant supply of clean water is always at hand. The establishment is capable of turning out about eight tons of starch daily, but is worked only for a few months in the autumn when new potatoes can be procured.

There are now ten factories on the island capable of making about 2500 tons of starch during the season, which is largely shipped to England and the United States, where it is principally used in the arts. When desired for use as an article of diet, it is preferable when about a year old, as it is then harder.

The potatoes, after being weighed, are dumped into a cellar which is connected by means of a shoot with a revolving cylinder having a stream of water running through it. The bottom of this shoot, instead of being solid, consists of a number of small iron rods placed longitudinally, and about an inch apart, which allows the dirt, etc., to fall through. From the cylinder, the potatoes fall into a long inclined trough, full of water, which has beaters or paddles revolving in it. The last two of these are broad and flat, and after the potatoes have gone the full length of the trough and have been thoroughly washed, they are thrown by the flat paddles into a box having a cylinder about six feet long, and twenty-two inches in diameter, covered with iron like a nutmeg grater, and turning at the rate of 700 revolutions a minute. This grates the potatoes, making them into a pulp which is washed by a stream of water on to long sieves made of number 70 brass wire which are kept in rapid motion. Over these is placed a long box with a bottom of zinc having three longitudinal lines of perforations, through which steady streams of water pour on the sieves washing all the starch through, while the fibre, etc., is shaken off and washed away. The starch water is carried into a series of tanks about 10 x 12 feet, and 6 feet deep where it is allowed to settle, which takes from seven to eight hours. The water is then drawn off and the tanks are filled again. After the starch has all settled and the water run off

a second time, the combined contents of the several tanks are shovelled into a larger one which is about 28 x 15 feet, and 6 feet deep. This is then filled with clean water, and by means of a large beater, the starch is stirred up and suspended in the liquid, giving it the appearance of milk, which is then pumped into tanks 24 x 12 feet, and about 5 feet deep, where it is again allowed to settle, taking about 15 hours. After the water has been drawn off, there is generally a superficial layer of about two inches consisting of fibre, dirt, etc., which is shovelled out, and thrown into a tank to go through the process again, while the clear starch is thrown into a mill and ground to a fine powder, which is then put upon racks to dry. These drying racks consist of a number of layers (about 16) of narrow strips of wood about an inch wide, which are arranged in such a way that the starch in falling through is distributed equally over them. They are kept at a temperature of about 120° Fahr. by means of steam, and it takes about 20 hours to dry eight tons. When perfectly dry, the racks are tipped, and the starch falls into bags placed in suitable positions.

A sample of the starch thus prepared, was examined, and the result of my investigations is given in the table below.

Six samples of starch were purchased in Philadelphia, and a qualitative examination was made for the purpose of comparing them. They fairly represent the commercial starch, being of various qualities, and bought in different sections of the city.

	Ash.	Moisture.	Soluble Matter.	Reaction.	Variety of Starch.
1	.275 per cent.	15.225 per cent.	.200 per cent.	Neutral.	Potato.
2	.432 per cent.	13.347 per cent.	.380 per cent.	Neutral.	Corn.
3	.439 per cent.	10.907 per cent.	.560 per cent.	Neutral.	Corn.
4	.641 per cent.	11.413 per cent.	.560 per cent.	Alkaline.	Corn.
5	.060 per cent.	12.452 per cent.	.200 per cent.	Alkaline.	Wheat.
6	.553 per cent.	.....	.....	.....	Corn.
7	.386 per cent.	.....	.....	.....	Corn.

The ash in each case was found to be soluble in HCl, with the exception of a slight residue, probably silicates incorporated during the washing process. On neutralizing this solution with NH₄ OH, and adding NH₄ HS, a black precipitate was formed in all the samples except No. 6, due to a trace of iron. No copper was found in any of the specimens.

The quantity of moisture varied, the potato starch (No. 1) contain-

ing most (15.225 per cent.), while No. 3 contained least (10.907 per cent.). The last two samples were not dried, but just the amount of ash ascertained.

On agitating 5 grms. of the starch with 100 cc. of distilled water, filtering and evaporating the filtrate to dryness, the amount of soluble matter was found to vary from 0.200 per cent. to 0.560 per cent. On redissolving this in distilled water, no reaction was given with Fehling's solution, nor was any change noticed after boiling with HCl, neutralizing with NH_4OH , and adding Fehling's solution. However, when treated with iodine, all gave the blue color, with the exception of No. 4. No ammonia odor was evolved on heating with strong NaOH solution, indicating absence of nitrogenous matter.

Distilled water agitated with the starch, then filtered, gave a neutral reaction to test paper, except Nos. 4 and 5, which were very slightly alkaline.

On boiling with water the order of transparency of the jelly was 1, 2, 4, 3, 5, No. 1 being perfectly clear, the others following in the order given, Nos. 3 and 5 having a faint blue tint.

On examination under the microscope, No. 5 was found to be wheat starch, the rest being corn starch, with, of course, the exception of No. 1, which was known to be from the potato.

ON IRIS TEST PAPER.

BY WM. G. GREENAWALT, PH. G.

Read at the Pharmaceutical Meeting, November 20th.

Last spring, while arranging some of our common blue flags for a floral display, I was attracted by their deep purplish blue color and conceived the idea that the coloring matter might be utilized for some good purpose. After a little thought upon the subject, I decided to try the effect of acids and alkalis upon it, when, as I had anticipated, the former produced a magenta red color, but to my surprise the latter gave a green color. I then prepared a strong infusion of the petals in hot water, filtered it, and evaporated to concentrate the solution. In this I dipped pieces of unsized white paper which were colored blue, the purplish hue being overcome presumably by the strength of the solution, and I found by experimenting that I had a very good test paper for acids and alkalis.

It is quite sensitive to the mineral acids even in dilute solutions, but I found it necessary to have rather strong solutions of the vegetable acids (acetic acid excepted) in order to get the color reaction. With the alkalies I experienced no trouble as it invariably turned green.

In order to form an approximate idea as to the strength of the solution necessary to make a good test paper, I procured a quantity of the flowers (which was necessarily small owing to the lateness of the season), took the purple parts of fifteen flowers, which weighed 450 grains, added two ounces of hot water, allowed it to stand ten minutes; then filtered it and evaporated to one-half ounce. This I found sufficiently strong for a good test paper.

On preparing red and green paper in the same manner as litmus paper is prepared, I found that the color is not permanent, but, in the course of a few days, changed back again to the original blue. Another strange feature I noticed, upon drying a portion of the flowers to ascertain the amount of moisture present, that the colored portion upon being thoroughly dried changed to a brown and therefore did not answer for testing. This shows that only fresh flowers could be used.

It is not likely that this coloring matter will ever answer for general use as well as litmus; but it would be interesting to know whether it might not be used in some cases where litmus would not answer the same purpose.

NOTE ON THE BLUE COLORING MATTER OF FLOWERS.

BY THE EDITOR.

Read at the Pharmaceutical Meeting, November 20th.

Mr. Greenawalt's observations with the flowers of *Iris versicolor*, recorded in the preceding paper, show that the coloring matter of these flowers agrees in behavior with that of other blue flowers. The principles to which flowers owe their characteristic colors do not appear to have been the subject of recent researches, and the results obtained by older investigations have been more or less forgotten, and are not referred to in many chemical text-books in which some information on such an interesting subject would naturally be sought for;

even Fownes' Manual is entirely silent on the coloring matter of flowers, carmin and carthamin excepted, though a number of other vegetable coloring matters have been described. The cause for this disregard is evidently to be looked for in the unsatisfactory results thus far obtained, and these are very easily explained by the difficulties surrounding an investigation of substances, which are apparently not crystallizable, and are known to be very readily altered under the influence of various physical and chemical agencies. It may, therefore, be of interest to give a brief summary of what is known concerning the nature of the blue coloring matter of flowers.

The influence of woodash and similar alkaline substances upon certain vegetable colors was known at an early period; but these characteristic reactions were first studied by Robert Boyle (1627-1691), who was "the first chemist, whose investigations in chemistry emanated solely from the noble impulse to explore nature."¹ He observed that the alkalies change the blue vegetable colors to green, several red ones to purple, the yellow colors to red, and that the vegetable colors altered by acids are restored by the alkalies.²

Since that time, and more particularly during the past, and the early part of the present century, the coloring matter of blue flowers has been frequently used as a reagent for alkalies and acids, until it has been entirely supplanted by litmus, turmeric and several artificial coloring matters. Thus we find, for instance, in "Cooley's Cyclopaedia of Practical Receipts," under the heading *Paper, Test*, directions for the preparation of test papers, and among other varieties the following in which the blue coloring matter of flowers and fruits is utilized:

Dahlia Paper; Georgina Paper.—From an infusion of the petals of the violet dahlia (*Georgina purpurea*), alkalies turn it green; acids red; strong alkalies turn it yellow. Very delicate.

Elderberry Paper.—From the juice of the berries, as the last.

Mallow Paper.—From an infusion of the purple flowers of the common mallow; affected like dahlia paper.

In some localities the flowers of the blue violet were employed as a reagent, and a permanent solution of the coloring matter, adapted for the purpose indicated, was recommended in 1810 by Descroizilles,³ to be

¹Kopp, *Geschichte der Chemie* I, 163.

²Ibid. III, p. 27.

³Trommsdorff, *Jour. der Phar.* xvii, 2, p. 304.

prepared by making an infusion of one part of violet petals with two parts of boiling water, and dissolving in the clear liquid one-third its weight of table salt; if kept in small well-corked vials, this solution is stated to remain unaltered in the sunlight. The blue flowers of the larkspur (*Delphinium*), and of the columbine (*Aquilegia*), treated in a similar manner, can also be used as chemical reagents.

Regarding the chemistry of the blue coloring matter, the principal investigations, embracing blue flowers of different orders, were published by Marquardt in 1835, and by Frémy and Cloëz in 1854, in addition to which a large number of observations on the coloring matter of certain flowers might be mentioned. Marquardt named the blue coloring matter *anthocyan*, the *cyanin* of Frémy and Cloëz, the latter name having been more recently appropriated for a blue dye-stuff derived from chinoline. The chemists named regard the coloring principles of all blue flowers as identical, the blue compound being amorphous, soluble in water and alcohol, but insoluble in absolute alcohol, ether, volatile oils, etc. Its solution is sometimes rapidly decolorized on exposure, also by reducing agents; it is colored red by acids, and green by alkalies, and yields with lead acetate a green precipitate. The coloring matter of red flowers is regarded as antho-cyan (*cyanin*) colored red by acids. Even white flowers often contain the same coloring matter, and hence are colored green by alkalies. The coloring matter of various berries is changed to green by alkalies, and to red by acids, and has been regarded as identical with that of blue flowers, but derivatives of quercitrin and rutin are likewise known, having similar reactions.

However, a large number of investigations have been made on red, purple and blue berries, proving that in many instances their coloring matters show decided differences in behavior. Similar observations have also been made with many red and purple flowers, which contain red coloring matters not agreeing with anthocyan in reactions. But the blue flowers examined by many chemists show in so far identical reactions, as they are turned red by acids, and green by alkalies. Some minor differences in behavior have been ascribed by Filhol (1860) to the presence of sugar and other compounds.

The identity of the blue coloring matters of different flowers has

as yet not been proven, and it is not improbable that a number of different compounds may ultimately be isolated, having similar, yet not identical properties; in other words, that the coloring matters of flowers differ to a greater extent than the earlier investigations seemed to indicate.

ANALYSIS OF COMMERCIAL SODIUM BICARBONATE.

A contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

By HERMANN M. J. SCHROETER, PH. G.

Read at the Pharmaceutical Meeting, November 20th.

The Pharmacopœia directs two kinds of bicarbonate of sodium: "Sodii bicarbonas" and "Sodii bicarbonas venalis." The commercial article as produced now on a large scale and found in the market is believed to be quite pure and is used very extensively. If the commercial product is found to be sufficiently pure to be used for most purposes, it would obviate the direction of two kinds by the Pharmacopœia. It is also believed that the commercial article is in most cases used by the pharmacist and by some exclusively. The object of this analysis is to show the difference existing between the commercial and the chemically pure article as now obtainable in the market. Whether any of the commercial products respond to the requirements of the pure, will be shown; and also whether the commercial kind is sufficiently pure for most purposes.

The commercial bicarbonate is prepared on a large scale among other processes by saturating sodium carbonate with carbon dioxide. The excess of normal salt is then washed out with water, the acid salt being much less soluble in water. Accordingly the commercial product contains always a certain amount of the normal salt. It is also stated that a small amount of carbonate, at least 1 per cent. is unavoidably present in every bicarbonate; this is due to the loss of some CO_2 on drying the salt and by age. By repeated washing of the commercial product, all of the normal salt is eliminated, besides some impurities, as chlorides and sulphates; but on drying even without application of heat, by moistening the washed salt with alcohol and then drying between folds of filter paper, it undergoes partial decomposition and contains about 1 per cent. of normal carbonate.

The following analysis consists of an investigation of 16 brands of

bicarbonate of sodium, 15 of which are commercial products and one was marked chemically pure. The samples were procured from different sources, constituting the most universally known brands. Nos. 1 to 8 inclusive, are of American manufacture, No. 8 being the C. P.; Nos. 9 to 14 inclusive are English, and Nos. 15 and 16 are French products.

The requirements of the Pharmacopœia were executed with each sample, and compared to classify them.

None of the samples on agitation with water left an insoluble residue. It is stated that the salt on continued heating loses moisture and carbon dioxide, amounting to about 37 per cent. by weight. This percentage will, of course, vary with the moisture present, and also the amount of total NaHCO_3 . While estimating with each sample, as will be shown later, the total loss on ignition was noted, and is as follows:

No. (1), 36.36 per cent. ; (2), 36.33 per cent. ; (3), 35.76 per cent. ; (4), 36.12 per cent. ; (5), 36.66 per cent. ; (6), 36.28 per cent. ; (7), 36.30 per cent. ; (8), 36.78 per cent. ; (9), 36. per cent. ; (10), 36.80 per cent. ; (11), 36.65 per cent. ; (12), 36.40 per cent. ; (13), 36.54 per cent. ; (14), 35.78 per cent. ; (15), 36.09 per cent. ; (16), 36.33 per cent.

For the detection of chlorides, a 1 per cent. aqueous solution of the salt was supersaturated with HNO_3 , and then AgNO_3 added. Only a slight opalescence was produced, and with most of them hardly perceptible. For sulphates another portion was similarly tested with BaCl_2 , showing but traces present in most cases. On heating a small portion with sodium hydrate, two samples, Nos. 5 and 10, gave evidence of ammonia, the others were free from same. No. 5 was manufactured by the Solvay or ammonia-soda process, and No. 10 was of English manufacture, and probably by the same process.

For the limit carbonate the following test was applied as directed : 2 gms. of the salt were dissolved in 30 cc. of cold water, and then added to a 5 per cent. aqueous solution of mercuric chloride. In the absence of more than about 3 per cent. of carbonate a white cloud should form only, but neither a red precipitate nor a red color should make its appearance within 3 minutes. According to this reaction, Nos. 1, 2, 7, 8, 9, 11, 13 and 16, gave either no precipitate, or only a white cloud. Nos. 3, 4, 6, 12, 14 and 15 gave either a light red color or a precipitate. Nos. 5 and 10 gave a decided white precipitate, but

no. color. This precipitate was found to be due to the presence of ammonia in these two samples. With a saturated aqueous solution of magnesium sulphate no precipitate was formed with any of the samples, indicating less than the limit of carbonate for the commercial variety.

The volumetric methods for the estimation of total bicarbonate were next experimented with. For the pure sodium bicarbonate the Pharmacopœia directs that 4.2 gms. of the salt should require not less than 49.5 cc. of the vol. sol. of oxalic acid for neutralization, corresponding to at least 99 per cent. of NaHCO_3 . For the commercial variety, 4.2 gms. of the salt should require not less than 47.5 cc. of the vol. sol. of oxalic acid for neutralization, corresponding to at least 95 per cent. of NaHCO_3 . It must be stated here, that this method of estimating the salt will not give correct results when it contains normal carbonate, for in that case the percentage of NaHCO_3 will be indicated too high and in some cases be above 100, according to the amount of Na_2CO_3 present. As will be seen by the following results, the volumetric method as directed in the Pharmacopœia for the estimation of total acid carbonate is incorrect and cannot be used to obtain accurate results. In executing this estimation an excess of noted volume of standard oxalic acid solution was first added. The CO_2 was expelled by boiling and then triturated by standard soda solution. The percentages given below are the equivalents of NaHCO_3 , according to the above method, but go to show the inaccuracy of same.

No. (1), 100.17 per cent. ; (2), 99.73 per cent. ; (3), 99.53 per cent. ; (4), 100.73 per cent. ; (5), 101.19 per cent. ; (6), 99.94 per cent. ; (7), 99.63 per cent. ; (8), 100.20 per cent. ; (9), 99.71 per cent. ; (10), 102.38 per cent. ; (11), 100.83 per cent. ; (12), 99.72 per cent. ; (13), 99.66 per cent. ; (14), 101.03 per cent. ; (15), 102.37 per cent. ; (16), 103.48 per cent.

After completing these preliminary tests and estimations it was thought advisable to make complete quantitative analyses of all the samples. On referring to numerous authorities for a method of estimating the normal carbonate in the bicarbonate, none could be found. The following method, however, was devised and used to estimate the moisture and the normal carbonate present. In a combustion tube connected with absorbing apparatus for H_2O and CO_2 , a weighed quantity of the salt was heated for about half hour. Sodium

bicarbonate is decomposed by heat into the normal carbonate, carbon dioxide and water. One hundred parts of NaHCO_3 will yield 63.095 p. Na_2CO_3 , 10.714 p. H_2O and 26.191 p. CO_2 . Knowing the amount of CO_2 produced by 100 parts of NaHCO_3 , the corresponding percentage of total NaHCO_3 in the sample can be calculated from the weighed products obtained by ignition in the combustion tube. The total CO_2 present in the sample was also estimated by decomposition with an acid and noting the loss. The difference between this total CO_2 and the CO_2 necessary for the NaHCO_3 present in the sample, would indicate the amount of CO_2 in combination as normal carbonate, in which form it can easily be calculated. In similar manner the amount of moisture was obtained. Knowing the theoretical quantity of H_2O produced from 100 parts of bicarbonate on decomposition by heat, the amount which would be formed from the percentage of NaHCO_3 present can then be calculated. The difference between this amount and the total amount of H_2O weighed on decomposition, represents the moisture.

The ammonia in Nos. 5 and 10 was estimated by the following method:—

An aqueous solution of a weighed quantity of the salt was boiled for some time with solution of soda. The NH_3 liberated was conducted into a flask containing 50 cc. of one-tenth normal oxalic acid solution. The absence of any sodium hydrate carried over during the process was verified by the flame test. The excess of oxalic acid was then triturated with soda solution of same strength. The results obtained were 0.217 per cent. and 0.366 per cent. of NH_3 for Nos. 5 and 10 respectively.

The amount of chlorides and sulphates was estimated in usual manner by precipitation with BaCl_2 and AgNO_3 , and weighing as BaSO_4 and AgCl .

The following table gives complete analysis of each sample:—

NaHCO_3	95.68	96.30	92.60	94.92	95.19	94.43	94.92	97.44	95.72	94.43	95.65	94.59	96.41	94.23	92.44	94.85
Na_2CO_3	2.45	2.10	4.50	3.52	2.00	3.58	2.99	1.88	2.98	2.57	2.95	3.79	2.37	4.25	4.91	3.15
NaCl	0.50	0.34	0.80	0.16	0.19	0.04	0.51	0.12	0.33	0.14	0.17	0.05	0.20	0.30	0.02	0.04
Na_2SO_4	0.40	0.38	0.54	0.07	0.05	0.67	0.22	0.05	0.12	0.02	0.01	0.03	0.02	0.13	0.55	0.57
NH_4HCO_3 .....	.....	.....	.....	.....	1.00	.....	.....	.....	.....	1.70	.....	.....	.....	.....	.....	.....
Moisture.....	0.89	0.83	1.57	1.27	1.55	1.24	1.26	0.47	0.77	1.07	1.13	1.48	0.92	0.99	2.00	1.33
	99.92	99.95	99.90	99.94	99.98	99.96	99.90	99.96	99.92	99.93	99.91	99.94	99.92	99.95	99.92	99.94

The above results would indicate an average of 3.21 per cent. of normal carbonate in the commercial product. The Pharmacopoeia allows for the commercial bicarbonate about 5 per cent. of carbonate, and for the pure a limit of 3 per cent. Accordingly the commercial product is almost equal to the requirements of the pure, and the majority of the samples responded to same, showing the superiority of the commercial product now in the market.

ANALYTICAL NOTES.

Abstracts from Theses.

Assay of Benzoin.—Thos. F. Moody, Ph.G., assayed ten commercial samples of benzoin, by digesting and afterward boiling in each case 20 grams with 10 gm. of slaked lime and 200 gm. of distilled water; the decoction was filtered, the residue well washed with hot water, the filtrate cooled and acidulated with hydrochloric acid. The precipitate was collected on a filter, washed with cold water, the filtrate agitated with chloroform, the chloroform solution evaporated and the residue added to the contents on the filter. After drying, the benzoic acid thus obtained was weighed, amounting for the samples examined to 2.14, 3.20, 3.40, 3.55, 4.0, 5.02, 5.50, 9.05, 9.72, and 10.45 per cent. In each case the presence of cinnamic acid was shown by the bitter almond odor produced on treatment with potassium permanganate. The author also states that he observed the white tears to yield a much smaller amount of benzoic acid than the brown mass, but analytical figures are not given.

Guaiac Resin.—John Herman Rabenau, Ph.G., examined four commercial specimens with the following results:

	Nos. 1.	2.	3.	4.
Soluble in petroleum benzoin.....	.006 per cent.	.002 per cent.	.01 per cent.	
Soluble in ether.....	52.8	" 73.9	" 66.9	" 49 per cent.
Treatment of ether extract with KHO, then HCl; precipitate weighed.....	29.4	" 54.7	" 28.1	" 30.7
Portion insoluble in ether, soluble in alcohol.....	9.9	" 6.1	" 12.2	" completely.
Ash from original resin,	6.45	" 4.75	" 9.75	" trace.

Extractum Glycyrrhizæ.—Four commercial samples of liquorice, of American manufacture, except No. 2, were examined by Wm. C. Müntzer, Ph. G. The moisture present was not determined. The water solution, treated with sulphuric acid, yielded crude glycyrrhizin, which was rendered pure by dissolving in ammonia and reprecipitating by acid. The portion insoluble in water was treated with ammonia, and this solution with sulphuric acid, when crude glycyrrhizin was obtained and purified as before.

	Cold distilled water.		Soluble portion, Glycyrrhizin.		Insoluble portion, Glycyrrhizin.		Total pure Glycyrrhizin.
	Insoluble	Soluble.	Crude.	Pure.	Crude.	Pure.	
1.....	27.70	72.30	11.65	8.70	1.47	1.04	9.74
2.....	26.86	73.14	4.18	2.57	5.35	4.20	6.77
4.....	24.15	75.85	6.93	5.95	1.54	1.10	7.05
3.....	47.29	52.71	7.40	2.64	2.03	1.50	4.14

Solubility in water not being a reliable indication for the purity of liquorice, the author suggests the following process of assay : Macerate for two hours in a flask 10 gm. of the extract, in coarse powder, with 190 gm. of distilled water and 10 gm. ammonia water ; allow to settle ; pour the liquid upon a filter ; rinse the flask and filter with about 100 cc., used in several portions, of the same menstruum, until the washings are no longer colored brown, acidulate the filtrate with dilute sulphuric acid ; allow to stand for one hour ; filter ; wash the precipitate with distilled water ; redissolve in 5 per cent. water of ammonia ; precipitate with sulphuric acid ; after one hour filter ; wash with distilled water until the washings produce no cloudiness with barium chloride ; dry the precipitate at 100° C., and weigh. The weight multiplied by 10 gives the percentage of glycyrrhizin contained in the extract.¹

Isinglass.—Robert Baird, Ph. G., examined the following commercial samples : Nos. 1, 2 and 3, Russian isinglass ; Nos. 4 and

¹ The exact solubility of glycyrrhizin in water of different temperatures, and in dilute acids of different strength, has not yet been determined.—Error.

5, American isinglass; No. 6, French gelatin, gold label; No. 7, French gelatin, bronze label; No. 8, Cooper's gelatin.

	No.	1	2	3	4	5	6	7	8
Ash		0.4	0.643	0.527	2.407	2.17	1.14	2.66	4.775
Moisture.....		12.1	12.8	12.5	13.0	12.3	12.8	13.4	13.0
Insoluble in hot water		6.0	5.2	5.5	10.0	18.5	Completely soluble.		
Jelly with 24 parts of		Slightly			Opal-				
hot water.....		None.		opalescent.		None.		Transparent.	
Parts of water for jelly		18	24	21	24	19	24	24	24

Commercial oxide of zinc was examined by William F. Hebeacker, Ph. G., and compared with a sample prepared by himself (No. 1). The results tabulated were as follows:

Sample.	Effervescence with acids.	Solution treated with excess of ammon. carb.	Acid solution treated with H ₂ S.
1.....	None.	Perfect solution.	No effect.
2.....	None.	Slight precipitate.	No effect.
3.....	Slight.	Perfect solution.	Slight precipitate.
4.....	Slight.	Slight precipitate.	No effect.
5.....	Slight.	Slight precipitate.	No effect.
6.....	Strong.	Slight precipitate.	No effect.
7.....	None.	Slight precipitate.	Slight precipitate.
8.....	Strong.	Perfect solution.	No effect.
9.....	Slight.	Slight precipitate.	No effect.
10.....	Slight.	Perfect solution.	Slight precipitate.

PHARMACEUTICAL NOTES.

Abstracts from Theses.

Abstractum Rhamni Purshianæ is a new preparation. Made into compressed pills it is one of the most agreeable forms for administering this drug, without the unpleasant taste, which is difficult to disguise. The dose is from three to fifteen grains. Harry Lippen, Ph. G., gives the following process for making this abstract:

Mix alcohol 15 fluidounces with water 1 fluidounce, and moisten with 2 fluidounces of the menstruum four ounces of the bark in No. 60 powder, pack in a percolator, and by maceration and displacement exhaust the powder, reserving the first 3½ fluidounces of the percolate. Distill off the alcohol from the remainder, mix the residue with the reserved portion, place the mixture in an evaporating

dish, and having added one ounce of milk sugar, set aside in a warm place to dry; then add enough milk sugar to make the mixture weigh two ounces, reduce to a fine uniform powder, and keep it in a well-stopped bottle.

Fluid Extract of Staphisagria.—J. Walton Travis, Ph. G., experimented on stavesacre seeds with menstruums of different alcoholic strength, containing to one part of water, respectively, eight, three, two and one part of alcohol. The fluid extracts prepared with these liquids contained the fixed oil of the seed, which could be separated by means of a separating funnel after keeping the fluid extract for some time at a temperature of 40°F. The ground seeds were then exhausted with petroleum benzin to which they yielded 24 per cent. of fixed oil, which was not further examined; the powder, thus exhausted, was used for the preparation, by the pharmacopœial method, of a fluid extract, the menstruum consisting of two parts of alcohol and one of water. The preparation was of handsome appearance, and upon standing for several months contained no precipitate.

Preparations of Calendula.—Frank G. Mumma, Ph. G., suggests as an antiseptic dressing

Calendulized lint.—Calendula in coarse powder, 12 parts, is percolated with dilute alcohol until 82 parts of tincture are obtained; add to this 6 parts of glycerin, saturate with the mixture 1 part of lint, and expose to the air until the alcohol and water have evaporated.

Tincture of Calendula, prepared with diluted alcohol, from either the leaves or the flowers does not differ much in color or taste, but that of the flowers is more aromatic. When, however, strong alcohol is used, the flowers yield a golden yellow, and the leaves a dark green tincture, the latter being also very unlike the former both in taste and odor.

Glycerite of Calendula.—Moisten half a troy ounce of calendula, in coarse powder, with a menstruum composed of 3 measures of alcohol, one of water and two of glycerin; then percolate to obtain 3 fluid-ounces of tincture; by means of a gentle heat evaporate the alcohol and water, add enough glycerin to make 3 fluidounces, heat for a few minutes and strain through fine muslin. It is not perfectly transparent. A glycerite of the leaves is very unlike that of the flowers.

Healing oil.—Ira L. Bond, Ph. G., states that this name is given near Tamaqua, Pennsylvania, to a mixture composed of fluid extract of calendula, 30 parts, and olive oil, 70 parts. It has been extensively

used, and with good results, as a healing application to incised and lacerated wounds.

Preparations of Pycnanthemum linifolium, Pursh.—Howard T. Painter, Ph. G., found the fresh herb to lose on drying from 50 to 60 per cent. of weight, and the air-dry herb to yield 6 to 7 per cent. of ash. The herb is known in some localities as *dysentery weed* and is used for dyspepsia and in bowel complaints, and in hot infusion as a diaphoretic. The following preparations are suggested:

Fluid extract of pycnanthemum.—The menstruum used is a mixture of alcohol 1 part and water 3 parts. The fluid extract is of a deep red brown color, has the characteristic odor and taste of the drug, and on standing for some weeks deposits a slight precipitate. The addition of 5 per cent. of glycerin to the menstruum does not prevent the precipitate.

Syrup of pycnanthemum, prepared from the fluid extract 25 parts, and simple syrup 75 parts, affords a pleasant form for administration.

GLEANNINGS FROM THE GERMAN JOURNALS.

By FRANK X. MOERK, PH. G.

Antiseptic Pastilles, for use in diphtheria, are made by incorporating boric acid and borax, each 20 gm., citric acid 12.5 gm., sodium benzoate 1 gm., oil of lemon 1.5 gm., oil of thyme 1 gm., oil of pepper-mint 0.5 gm., with glycerin and water as solvents, and gum, sugar and gelatin as basis, and dividing into 500 pastilles.—*Schmidt's Jahrbuch, Pharm. Centralhalle*, 1888, 501.

Helleborein, the glucoside of *Helleborus niger* and *Helleborus viride*, has been used as a substitute for digitalis. Victorio and Ehridia have discovered that it is an efficient local anæsthetic; when used in one per cent. aqueous solution, three or four drops placed in the eye of a dog or rabbit produce anæsthesia of the cornea, lasting about 30 minutes, without producing disagreeable secondary effects.—*Apoth. Zig.*, 1888, 793.

Oleum Theobromæ has been re-investigated by Paul Graf, who finds it to contain small quantities of free fatty acids and cholesterin. The liberated fatty acids on distillation gave evidence of formic, acetic and butyric acids; oleic acid is present, and after its separation, arachic, stearic and lauric acids were isolated by fractional precipitations with

magnesium and barium acetates. The determinations of glycerin gave as a mean 9.59 per cent. Melting-point determinations, made in an open tube, gave for specimens of various sources figures varying from 29.4 to 33.4° C., while those made in a closed tube gave, with one exception, a uniform melting point at 34.3°.—*Arch. der Pharm.*, 1888, 830.

Detection of Colophonium.—A solution of this in glacial acetic acid, on addition of a drop of concentrated sulphuric acid, assumes an intense red to blue-violet color, soon changing to yellowish-brown, having decided fluorescence. In the examination of soaps, the separated fatty acids are dissolved in glacial acetic acid by application of heat, allowed to cool, and then the sulphuric acid (sp., gr. 1.53) added. Serviceable for the detection of rosin in bees'-wax.—Th. Morawski, *Chem. Rpt.*, 1888, 270.

Nitrous acid in water, in quantities not detected by diphenylamine, is indicated on addition of hydriodic acid by the liberation of iodine after standing a short time.—W. Kalmann, *Chem. Rpt.*, 1888, 269.

Eseridine an alkaloid of the Calabar bean and closely related to physostigmine is convertible into the latter by warming with dilute acids, consequently its solutions in dilute acid should always be made in the cold. Its action on the system is to cause certain diarrhoea with little or no action on the central organs; its toxic dose is six times greater than that of physostigmine. Used in 1% solution made by adding one drop dilute sulphuric acid for every 0.1 gm. eseridine, which solution keeps unchanged for long periods.—*Rdsch.*, 1888, 841.

Ferrous solutions.—The reduction of oxidized and discolored ferrous solutions can be accomplished by freezing the solutions. Languelin observed that a 30% ferrous sulphate solution which had become strongly colored and deposited a red-brown precipitate, after freezing and subsequent liquefaction, reassumed its original green color, the precipitate also partially disappearing. The solution had also lost considerably its tendency to oxidize.—(*Arch. de Pharm.*) *Rdsch.*, 1888, 844.

Solution of Bromides.—Dr. Erlenmayer recommends: Potassium and sodium bromide of each 4 gm., ammonium bromide 2 gm., water of ammonia 1 drop, carbonated mineral water 600 gm.—*Pharm. Zig.*, 1888, 644.

Hydrargyrum phenylicum or *carbolicum* used as a syphilitic specific is prepared as follows: Potassium phenol is first made by taking 94

parts crystallized carbolic acid and 56 parts potassium hydrate, dissolving in 90 per cent. alcohol evaporating to syrupy consistence on a water-bath and drying over H_2SO_4 . Of this 100 parts are dissolved in alcohol, the solution filtered and precipitated with an alcoholic solution of 112 parts corrosive sublimate; the orange precipitate is well washed with 60 per cent. alcohol until only a faint turbidity with $AgNO_3$ results, then it is washed with strong alcohol until the washings contain no mercury (indicated by H_2S). Dried over H_2SO_4 the preparation is an amorphous brick-red powder of faint phenol odor. It differs from the commercial article in giving the tests for phenol by extracting an acidulated solution with ether, dissolving the ethereal residue in water and adding Fe_2Cl_3 or bromine-water. The formula is $(C_6H_5O)_2Hg$ containing 51.81 per cent. Hg; found in the above 51.68 per cent.—Hugo Andres, *Pharm. Ztschr. f. Russl.*, 1888, 625.

The examination of potassium or sodium iodide, containing iodate, for nitrate can be made in the usual way, by use of $FeSO_4$ and H_2SO_4 , after boiling 0.5 gm. of the sample with 1 gm. $CuSO_4$, 0.8 gm. Na_2SO_3 and 10 cc. water until all of the iodine is precipitated as cuprous iodide and filtering; the boiling generally requires about one minute.—C. Schwartz, *Pharm. Ztg.*, 1888, 612.

Lactucarium.—Kremel has found in various specimens an adulteration with bread crumbs. Lactucarium extracted with a mixture of 3 parts alcohol and one part chloroform should yield from 55 to 60 per cent. extract (chiefly lactucon). The percentage of moisture and ash is also affected by an addition of bread crumbs. No. 1, was a pure specimen; 2 and 3 were adulterated, starch could be detected in these by the microscope as well as the iodine test in an aqueous decoction.

	Moisture.	Ash	Chloroform-Alcohol Extract.
1	5.80 per cent.	6.50 per cent.	57.46 per cent.
2	5.88 "	4.51 "	40.00 "
3	10.84 "	1.61 "	11.54 "

—*Pharm. Centralhalle*, 1888, 512.

Mercuric Salicylate.—The re-actions of this compound, solubility in solutions of $NaOH$ and $NaCl$, are not gotten with the product obtained by the precipitation of $HgCl_2$ with sodium salicylate; the formula for this salt is $(C_7H_5O_3)_2Hg$. The process, if modified, so as to precipitate first the mercuric oxide from 271 parts, $HgCl_2$ with $NaOH$, washing, transferring to a vessel, covering with water, adding 138 parts salicylic acid and warming for a few hours with frequent stirring until the yellow color of the oxide is changed to the white

color of mercuric salicylate, will yield a product which should be entirely soluble in NaOH; should this not be the case an additional quantity of salicylic acid should be added. The precipitate is washed and dried at a moderate temperature; it possesses the formula

$$\text{C}_6\text{H}_4\text{CO}-\overset{\text{O}}{\text{O}}\text{Hg}.$$
—J. J. Kranzfeld, *Pharm. Ztschr. f. Russl.*, 1888, 641.

Alcohol adulterations of volatile oils can be detected and estimated by agitating the oils with twice their volume of glycerin of sp. gr. 1.215 (contains about 20 per cent. water which prevents the glycerin from dissolving a portion of the volatile oil) in a graduated tube or cylinder for 5 minutes and allowing to stand until the mixture separates into two layers; the increase of the glycerin layer is due to the alcohol. If the tare of the cylinder be taken and the oil and glycerin weighed, the oil after separating can be removed by a pipette (the last drops are best absorbed by a piece of filter paper) the increase in weight of the glycerin is directly due to the alcohol present in the oil.—H. Hager, *Pharm. Ztg.* 1888, 650.

Safranin, a new reagent for glucose. The procedure in testing urine is to take 1 cc. urine, 5 cc. safranin solution (1 : 1000), 2 cc. solution of soda and heat to the boiling point; if decolorization takes place the urine is abnormal. From a number of experiments the author comes to the conclusion that all normal urine contains small quantities of carbo-hydrates, but the amount is not sufficient to decolorize the above quantity of safranin solution. Uric acid, kreatin, chloral, chloroform, hydrogen peroxide, and hydroxylamin salts, which reduce Fehling's solution, will not decolorize this test solution. Albumen, however, decolorizes it completely, but *very slowly*.

The solution keeps indefinitely, and is also of service in the detection of sugar (in foods, etc.), and glucosides after boiling with mineral acids.—L. Crismer, *Pharm. Ztg.*, 1888, 651.

Disinfectant soap for surgeon's use, proposed by Reverdin, is made from oil of sweet almonds, 72, solution of potash, 12, solution of soda, 24, sulphocarbolate of zinc, 2, rose water, 10. Mix the oils with the alkalies, add the zinc salt dissolved in the rose water, and keep at 20° for several days; pour into moulds. Contains an excess of fat.—*Pharm. Ztg.*, 1888, 660.

Cod-liver oil.—The rancidity of the oil does not depend upon the presence of free fatty acids, as in the case of butter, but is due to other

causes, possibly to heat and exposure to air. Oil extracted from fresh livers contained from 0.3 to 0.4 per cent. free acid (calculated as oleic acid), made from livers seven days old 0.9 per cent. acid. If air be slowly drawn through fresh oil heated on a water-bath during the first half hour there is a slight loss of acidity; if continued longer a slight increase of acids results (to 0.7 per cent. in $5\frac{1}{2}$ hours). Rancidity was noticeable in all samples heated for more than 30 minutes, but the increase of acid being so slight it is impossible that this is the cause; fatty acids were liberated from a specimen of fresh oil, and these added to the oil in smaller and larger quantities, but in no case did it give the peculiar odor and taste of the rancid oil. Cod-liver oil carefully stoppered is not prone to change; specimens from 1884, 1885, 1886, 1887, showed respectively 0.37, 0.38, 0.36, 0.36 per cent. free acid. The cruder oils for medicinal and technical uses gotten through fermentation of the livers contain from 3.79 to 28 per cent. free acid, and still were free from rancidity. Fermentation produces the excessive acidity of the cruder oils. The acidity of oils obtained from the livers of various species varies decidedly:

Gadus virens, 0.17 per cent.; *Brosmus brosme*, 0.08 per cent.; *Molva vulgaris*, 4.36 per cent.; *Raja radiata*, 4.80 per cent.; *Lamna cornubica*, 2.62 per cent.—Heyerdahl, *Chem. Ztg.*, 1888, 1475.

Japan wax, examined by Eberhard, is composed chiefly of palmitin containing also small quantities of isobutyric and palmitic acids. The white coating which appears with age consists of palmitic acid.—*Rdsch.*, 1888, 844.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the AMERICAN JOURNAL OF PHARMACY.

TERPIN IN BRONCHITIS.—This remedy seems to have been largely prescribed of late by Parisian physicians. Chéron's preparation has been most frequently used; it is given as follows in the *Monde Pharm.* of October 5th: Terpin, 5 gm.; glycerin, alcohol of 95 per cent., syrup of honey, of each, 70 gm.; vanillin, 0.02 gm. A tablespoonful contains 50 cgm. of terpin. Two tablespoonfuls are given daily to loosen and finally diminish expectoration. In the above doses it is not liable to cause gastric disturbance, especially if given after meals.

MOUTH WASH.—The following wash for shrinking of the gums is given by various French journals of pharmacy: Tannic acid, 8 gm.;

tr. iodine, 5 gm.; iodide potass., 1 gm.; tr. myrrh, 5 gm.; rose-water, 200 gm.; mix. A teaspoonful in a third of a tumbler of water.

DENTITION SYRUP.—Paul Vigier proposes the following formula: Hydrochlorate of cocaine, 0.10 gm.; syrup, 10 gm.; tr. saffron, 10 drops; mix; to be rubbed upon the gums several times daily.—*Le Prog. Méd.*, Sept. 15, 1888. See also *AM. JOUR. PHAR.*, 1886, p. 295.

ANALGESIC COTTON.—Under the name of "cocained and morphinated cotton" the following formula by Eller is given in the *Union Méd.*, Oct. 20, 1888: Solution of cocaine (3 per cent.), 30 gm.; morphine sulph., 0.8 gm.; absorbent cotton, 30 gm. Dissolve the morphine in the cocaine and soak the cotton in the solution. It may be made into a small ball and introduced into the cavity of an aching tooth, or, previously moistened, may be used in like manner for ear ache.

BONT'S BLISTERING LIQUID.—The formula is given in *L'Union Pharm.* as follows: Pulv. camphor, 20 parts; chloral, 30 parts; melt at 140° F., and add 10 parts pulv. cantharis; agitate for 1 hour, with heat, but do not let the temperature go above 158° F.; filter. This vesicant liquor may be used with compresses, or painted on with a brush.

APPLICATION FOR WARTS.—The following formula is given by the *Union Médicale*, Oct. 30th. Protochloride of mercury, 15 gm.; pulv. boric acid, 7.50 gm.; pulv. salicylic acid, 2.50 gm.; mix; apply three times, daily.

CHLORAL AMMONIUM.—According to *Nouv. Rem.*, Nov. 8, 1888, this substance is trichlor-amido-ethylic alcohol, having the formula $C_2HCl_3.NH_2.OH$, as stated by Nestbit in *L'Orosi*, Aug. 1888. It is obtained by passing a current of dry ammonia gas through anhydrous chloral dissolved in chloroform. A crystalline mass is produced which is removed and dried in vacuo. It resembles chloral in taste and odor, but the taste is less persistent. According to Nestbit, chloral ammonium used in 1 to 2 gm. doses gives the therapeutic effects of urethan and chloral, being both hypnotic and analgesic. Its action upon the heart and respiratory centres is less strong than that of chloral.

TO MARBLEIZE UTENSILS OF IRON OR BRASS.—M. Glibert's process is given in *Nouv. Rem.*, Nov. 8, as follows: Make a thin mixture of any desirable color of powdered enamel, in water, to which has been added a small quantity of glycerin, and apply with a brush. Then go over the work with a spray of oil of turpentine until spots appear and, when dry, bake in the usual manner.

TEST PAPERS FOR URINE.—As described to the *Soc. des. Sci. Méd. de Gannat*, these consist of small leaves of paper which, having been dipped into the proper solutions and dried, are bound into small books which may be carried in the pocket. The papers for albumin tests are made with ferrocyanide of potassium, tungstate of sodium, picric acid, potassio-mercuric iodide and citric acid; those for sugar consist of indigo carmine, carbonate of lime, etc. Litmus papers are included. With these, a test tube and a few "densimeters," the physician or pharmacist is able to make rapid tests. Twenty ccm. of the urine is placed in a tube and its reaction is ascertained. If alkaline one or two citric acid papers are added and the mixture clouds with albumin, mucin or the urates. With heat the urates re-dissolve, as also resinous substances (which are rarely present). Mucin is easily recognized by its characteristic appearance. One of the papers for albumin is then dipped into the solution and that substance is precipitated. To find sugar, 10 ccm. of pure water are placed in the tube with an indigo carmine paper, heating slightly. A soda paper and a drop of urine are added. The liquid is then heated for one minute and urine added, drop by drop, until the change takes place. The "densimeters" are the well-known specific-gravity beads which float or sink in accordance with the density of the solution. *L'Union Méd.*, Oct. 9, 1888.

TEST FOR ARSENIC.—To the suspected liquid is added, in a test tube, a solution of caustic potash or soda, and then a fragment of aluminium. The mouth of the tube is then closed with paper dipped in a solution of nitrate of silver. If arsenic be present the paper turns black. Aluminium is preferable to zinc, for the latter may contain arsenic, while aluminium is always free from it.—*Farm. Ital.*; *Arch. de Pharm.*, October 5, 1888.

BENZOIC ACID IN ALIMENTS.—Its use in beer and in foods of all kinds has been reported against by the *Comité d'Hygiène* on the ground that "substances having antiseptic qualities are injurious to the normal evolution of the digestive processes."—*Arch. de Phar.*, October 5, 1888.

PAVESI'S COSMETIC.—The formula for this solution—used for discolorations of the skin—is given in the *Monde Phar.*, Nov. 5, 1888, as follows: Borate of sodium, 10 gm.; glycerin, 20 gm.; rose-water, 150 gm.; alcoholic tincture of benzoin, 15 gm.; let the mass rest for several days and then filter. To be applied twice daily.

ACTION OF ALKALINE PHOSPHATES ON THE ALKALINE EARTHS AND OTHER OXIDES.¹

By L. OUVRARD.

The oxide or a salt of the alkaline earth was dissolved in the fused phosphate, with or without an alkaline chloride, allowed to cool slowly, and the product treated with water.

Barium oxide dissolves readily in potassium metaphosphate or pyrophosphate, and in both cases yields the pyrophosphate $\text{Ba}_2\text{P}_2\text{O}_7$ in monoclinic prisms which dissolve readily in dilute acids and in concentrated sulphuric acid. In presence of potassium chloride, the result is the same if the proportion of the phosphate is not below 5 per cent., but with a lower proportion a chlorophosphate is formed. Precipitated barium phosphate behaves in the same manner as the oxide. Barium sulphate also dissolves and yields the pyrophosphate, the excess of sulphate crystallizing in the form of barytes.

Potassium orthophosphate with barium oxide, chloride, or phosphate, yields the compound $\text{P}_2\text{O}_5, 2\text{BaO}, \text{K}_2\text{O}$ in transparent, dendritic crystals, soluble in dilute acids.

Sodium metaphosphate and pyrophosphate yield either barium pyrophosphate or, if the proportion of barium is considerable, the compound $\text{P}_2\text{O}_5, 3\text{BaO}$, which crystallizes in large, transparent, lamellæ, seemingly belonging to the regular system; sp. gr. 4.1 at 16°. The crystals dissolve in dilute acids and in concentrated sulphuric acid. Sodium chloride promotes crystallization, but if the proportion exceeds a certain limit, a chlorophosphate is formed. Sodium orthophosphate yields only the compound $\text{P}_2\text{O}_5, 3\text{BaO}$. Barium sulphate is not decomposed by the sodium phosphates; it dissolves to a certain extent but crystallizes unaltered on cooling.

Calcium oxide, phosphate, or sulphate with potassium metaphosphate or pyrophosphate, yield the compound $\text{P}_2\text{O}_5, \text{CaO}, \text{K}_2\text{O}$ in large, transparent hexagonal lamellæ derived from the regular octahedron; sp. gr. 2.7. The same compound is also obtained from calcium chloride or fluoride if the alkaline phosphate is in sufficient excess; it dissolves readily in dilute acids. Tripotassium phosphate and calcium oxide form the compound $\text{P}_2\text{O}_5, 2\text{CaO}, \text{K}_2\text{O}$, which has the same crystalline form as the corresponding barium salt, and has already been described by Grandeau, who obtained it by Debray's method. Sodium meta-

¹ *Compt. Rend.*, cvi., 1599 and 1729; reprinted from *Jour. Chem. Soc.*, October, p. 1033, 1035.

phosphate yields two products according to the proportion of oxide employed, namely, $9\text{P}_2\text{O}_5, 10\text{CaO}, 8\text{Na}_2\text{O}$, which was previously obtained by Wallroth, under the same conditions, and forms monoclinic lamellæ, and $\text{P}_2\text{O}_5, 2\text{CaO}, \text{Na}_2\text{O}$, which has been described by Ditte, and forms transparent hexagonal rosettes. Sodium pyrophosphate and orthophosphate yield the salt $\text{P}_2\text{O}_5, 2\text{CaO}, \text{Na}_2\text{O}$, and also the salt $2\text{P}_2\text{O}_5, 3\text{CaO}, 3\text{Na}_2\text{O}$, which crystallizes in slender, transparent monoclinic needles melting to a white enamel at a red heat. With the carbonate, phosphate, sulphate, chloride, and fluoride, the same products are obtained as with the oxide. With sodium or calcium chloride in excess, chlorophosphates corresponding to apatite and wagnerite are formed.

Strontium oxide and salts with potassium meta- or pyro-phosphate yield the compound $\text{P}_2\text{O}_5, \text{SrO}, \text{K}_2\text{O}$, identical in form with the corresponding calcium salt. Tripotassium phosphate produces the compound $\text{P}_2\text{O}_5, 2\text{SrO}, \text{K}_2\text{O}$, identical in form with the analogous barium and calcium compounds. Sodium meta- and pyro-phosphates yield first the compound $\text{P}_2\text{O}_5, 2\text{SrO}$ in small, rhombic prisms similar to those of the barium salt, and then the compound $\text{P}_2\text{O}_5, 2\text{SrO}, \text{Na}_2\text{O}$ analogous to the product obtained with calcium. Sodium orthophosphate yields only the salt $\text{P}_2\text{O}_5, 2\text{SrO}, \text{Na}_2\text{O}$; strontium sulphate is not decomposed by the sodium phosphates.

Barium is not readily displaced by alkalis, and therefore does not readily form double salts. Calcium forms double phosphates only, and strontium occupies an intermediate position.

Magnesium.—With potassium metaphosphate, the sole product is the compound $3\text{P}_2\text{O}_5, 2\text{MgO}, \text{K}_2\text{O}$, which crystallizes in large, monoclinic prisms, very soluble in dilute acids; sp. gr. at $20^\circ = 2.4$. It is analogous to the double magnesium sodium phosphate obtained by Fleitmann and Hennerberg in the wet way.

Potassium pyrophosphate or orthophosphate yields rhombic prisms of the salt $\text{P}_2\text{O}_5, 2\text{MgO}, \text{K}_2\text{O}$, previously described by Grandeau. Magnesium phosphate yields the same products as the oxide, but the chloride yields a chlorophosphate unless the alkaline phosphate is present in considerable excess.

With sodium metaphosphate at a low temperature, the magnesium oxide not being in excess, the salt $9\text{P}_2\text{O}_5, 10\text{MeO}, 8\text{Na}_2\text{O}$ is obtained in highly macled, monoclinic prisms; sp. gr. at $20^\circ = 2.7$. This compound has previously been described by Wallroth. At a high tem-

perature, the metaphosphate yields dendritic crystals of the compound $P_2O_5, MgO, 2Na_2O$, and the same product is obtained with the pyrophosphate. It is readily soluble in dilute acids. Sodium orthophosphate yields the salt $2P_2O_5, 3MgO, 3Na_2O$ in dendritic crystals which depolarize light.

Zinc and cadmium yield compounds which are strictly analogous. With potassium metaphosphate, the salt P_2O_5, MO, K_2O is obtained in highly maced crystals which depolarize light and are soluble in dilute acids. Potassium pyro- or ortho-phosphate yields monoclinic prisms of the salt $P_2O_5, 2MO, K_2O$, very soluble in dilute acids. Zinc and cadmium phosphates yield the same products as the oxides, and alkaline chlorides have no effect on the result even when present in large excess. The compound just described can, in fact, be obtained by the action of cadmium or zinc phosphate on potassium chloride.

Sodium metaphosphate yields the salt P_2O_5, MO, Na_2O , described by Wallroth, or the salt $P_2O_5, 2MO, Na_2O$, described by Scheffer, or a third salt $P_2O_5, MO, 2Na_2O$; according to the relative proportions of the oxides; sodium pyro- or ortho-phosphate yields the compounds $P_2O_5, MO, 2Na_2O$ and $P_2O_5, 2MO, Na_2O$.

Manganese yields products similar to those obtained with zinc and cadmium, but in presence of an alkaline chloride chlorophosphates are formed if the proportion of alkaline phosphate falls below a certain limit. P_2O_5, MnO, K_2O and $P_2O_5, 2MnO, K_2O$ crystallize in monoclinic prisms; P_2O_5, MnO, Na_2O forms highly maced rose-colored prisms which are probably triclinic. $P_2O_5, MnO, 2Na_2O$ and $P_2O_5, 2MnO, Na_2O$ are isomorphous with the corresponding zinc and cadmium salts.

Cobalt and nickel form strictly analogous compounds. Potassium metaphosphate yields monoclinic prisms of the composition, $2P_2O_5, 3MO, 3K_2O$, and the pyro- and ortho-phosphate yield rhombic crystals of the salt $P_2O_5, 2MO, K_2O$, all soluble in dilute acids. The presence of potassium chloride promotes crystallization, but exerts no other influence on the result.

Sodium metaphosphate yields the salt $9P_2O_5, 10MO, 8Na_2O$ in maced, dichroic violet or rose-colored prisms, or, if the oxide is in excess, the salt $P_2O_5, 2MO_3, Na_2O$, which is isomorphous with the corresponding zinc salt; sodium pyro- or ortho-phosphate yields products strictly analogous to those obtained with zinc, cadmium, and manganese. In presence of sodium chloride, all the double phosphates of nickel or cobalt are converted into the salt $P_2O_5, 2MO, Na_2O$.

THE PHYSIOLOGICAL ACTION OF BORNEOL.¹

By RALPH STOCKMANN.

This paper is an account of a very complete investigation of the pharmacology of three substances, viz., "Borneo Camphor," "Ngai Camphor," and a body prepared artificially from oil of turpentine. These are identical in chemical composition, and possess the formula $C_{10}H_{16}O$; they differ, however, in their action on polarized light. For comparison the pharmacology of ordinary laurel camphor ($C_{10}H_{16}O$) and menthol ($C_{10}H_{20}O$) was also investigated. The result shows a general similarity of action in the different members of this "camphor group," agreeing in all essential points with our previous knowledge of camphor, but by placing that knowledge on an experimental basis, Dr. Stockmann's researches may do something towards increasing the usefulness of a drug possessing valuable therapeutic properties, but which is apt to be looked upon as obsolete for any active purpose.

Frogs, rabbits, guinea-pigs, cats and dogs were all poisoned by the drugs, the symptoms being those of a gradually deepening paralysis, affecting brain first, then medulla, spinal cord, and finally the motor nerves. In mammalia the encephalon was chiefly involved, convulsions, resembling epilepsy, being produced (most typically in cats) by doses of two to three grams. Smaller doses caused symptoms similar to those of alcoholic intoxication. No convulsions were produced after removal of the cerebral cortex in rabbits.

On the heart of the frog.—Williams's apparatus being used, the frequency of the heart beats was diminished, but their amplitude greatly increased, the blood pressure being also markedly increased, as well shown in some excellent heart-tracings which accompany the paper. Large doses killed the heart rapidly in diastole.

In mammalia no constant results could be obtained on the pulse or blood pressure.

The *vessels* were greatly dilated by solutions containing borneol—one cornu of a sheep's uterus being used and maintained at the temperature of the body.

Respiration was slowed from the first.

Muscles were unaffected by all ordinary doses.

¹ *Journal of Physiology*, August, 1888; reprinted from *Medical Chronicle*, November, p. 145.

The *white corpuscles* of the blood were not increased in number by borneol. Binz has shown that most essential oils have the power of increasing the white corpuscles.

Glycosuria occurred in cases of poisoning by borneol, in which convulsions were a marked feature.

On temperature no constant result was obtained.

From his experiments Dr. Stockmann concludes:—

(1) That the camphor group is closely allied to the alcohol group in physiological action—menthol approaching it most nearly; as the number of H atoms diminishes in the different camphors we get an increased tendency to produce convulsions of cerebral origin.

(2) That pharmacological investigation confirms the value of these drugs in cases of increased spinal excitability.

(3) As cardiac stimulants they are closely allied to alcohol, but, in addition, they directly dilate the peripheral vessels—an action which Kober has shown not to be produced by ethyl alcohol.

(4) Borneol is less irritating locally than common laurel camphor, and could be given in much larger doses without causing untoward cerebral symptoms.

PROPERTIES AND USES OF SOZIODOL.

BY LEOPOLD LARMUTH.

This substance, which was introduced by the firm H. Tromsdorff, of Erfurt, as a substitute for iodoform, is chemically an iodated phenyl sulphonic acid, more exactly diiodoparaphenolsulphonic acid. It is prepared in the following manner: By the action of concentrated sulphuric acid on phenol, one of the H atoms of the benzol ring is re-

placed by the group SO_3H . The body $\text{C}_6\text{H}_4 \begin{smallmatrix} \text{OH} \\ \text{SO}_3\text{H} \end{smallmatrix}$ being obtained, the

potassium salt of this acid is prepared, dissolved in water, and treated with iodine chloride. By this means two hydrogen atoms of the benzol ring are replaced by iodine, and the potassium salt of the iodated acid

separates out $\text{C}_6\text{H}_2 \begin{smallmatrix} \text{OH} \\ \text{I}_2 \\ \text{SO}_3\text{K} \end{smallmatrix}$; it is purified by repeated crystallization from

water and dried. It occurs in the form of regular, well-formed, colorless and odorless crystals, which are slightly soluble in cold water, 1.8 parts being dissolved in 100 parts of water at 17°C .: it is

much more soluble in warm water, and slightly soluble in glycerin and alcohol. From this body soziodolic acid and all the other salts are prepared. The free acid crystallizes from water in the form of needle-shaped prisms; it is freely soluble in water, alcohol, and glycerin. With regard to the position of the iodine atoms, Herr Ostermeyer, the discoverer of the body, considers that they are in close proximity to the hydroxyl group. Various salts have been prepared; the chief which have, however, been therapeutically investigated, are those of sodium, potassium, zinc, and mercury. The sodium salt is much more soluble than that of potassium; it contains two molecules of water, and is soluble in cold water and glycerin to the extent of 6 per cent. The zinc salt is somewhat more soluble. The mercury salt occurs in the form of a fine yellow powder; it is almost insoluble in water, but pretty freely soluble in sodium chloride solution. Besides these compounds, salts of aluminium, magnesium, lead, barium, silver, and ammonium have been prepared. Soziodolic acid and its salts are effective antiseptics. Langgaard¹ states that an admixture of from 0.5 to 1 per cent. to gelatine cultivations restrained the development of streptococcus pyogenes aureus. The free acid being more powerful than the salts, an addition of 2 per cent. completely restrained the development of the organisms; upon bacteria of putrefaction and moulds the action is not so powerful. Therapeutically, soziodolic acid and its salts have been used chiefly in cutaneous diseases and in affections of the nose and pharynx. In the former Dr. Oscar Lassar reports most successful use of the drug, both pure and with admixture, as dusting powder, and in the form of paste, with zinc, starch, vaselin, and lanolin. He states that it is of most decided service in eczema, herpes squamosum, herpes tonsurans, and impetigo. He has also used it in ulcers and simple wounds with most gratifying success. He states that a 10 per cent. paste is most successful in the treatment of mycoses. As a dressing for sores soziodol with talc is most valuable, in many respects competing with salicylic acid, and unlike that substance, not causing artificial inflammation when applied in a concentrated state. The use of soziodol in affections of the nose and pharynx is reported on by Dr. M. A. Fritsche.² He has had most satisfactory results in the use of the drug in cartarrh, in which the secretion has a tendency to thicken and dry, *e. g.*, laryngitis sicca, rhinopharyngitis,

¹ *Théráp. Monatsh.*, 9, 1888, p. 433.

² *Théráp. Monatsh.*, 6, 1888.

hypertrophic rhinitis, etc.; the inflammation of the mucous membrane diminished, and the character of the discharge was much improved. In ozœna the mercury and zinc salts were used alternately daily, with much beneficial result, a momentary active secretion being caused, followed by a complete disappearance of the fœtor. In tubular ulcers of the larynx improvement was noted; in syphilitic affections of the mouth and nose the mercury salt afforded most substantial service, gummatous affections of the velum and tongue being completely cured by insufflation of mercury sozoiodol combined with slight internal mercurial treatment. Internally the salts have been experimentally used by Langgaard,¹ who found that on rabbits the sodium salt had no toxic effect in doses of 1 gm. (15 grs.); it was also found that the iodine was excreted as an organic compound by the urine; it may be here mentioned that Cohn² could not find any potassium iodide in the lacrymal secretion during the administration of sozoiodol compounds. Langgaard concludes that the bodies may, so far as their iodine is concerned, be considered as non-poisonous, in distinction to iodoform and iodo.

Bufalini (*Ann. de Chim. e di Farmac.*, 1888, May, p. 308) has administered the drug to a considerable number of cases of phthisis. He observed little alteration, though the dose was as much as 1.5 gm. per diem, and certainly no toxic symptoms.

I have been using sozoiodol compounds for some time, and have to report most favorably on the results obtained; especially in rhinopharyngitis and rhinitis is this the case; the surfaces clean under the influence of the drug, and show a decided tendency to heal. In chronic purulent otitis the drugs have rendered very good service both in solutions and in insufflations; in ozœna, too, I can entirely confirm the observation of Dr. Fritsche.

With respect to the doses of the several salts, the sodium compound is used pure, or dissolved in water 3 to 10 per cent.: gauze and wool impregnated with this salt are now prepared, and are most convenient for wound dressings. If a prolonged action is wanted, the less soluble potassium salt is used, either pure or mixed with talc or milk sugar, five to ten per cent.; as ointments, all the salts are used made up with lanolin as base in the strength of five to ten per cent.; as pastes

¹Langgaard, *op. cit.*

²Ueber die Wirkung des Calomel bei gleichzeitiger Anwendung einiger substituirten Jodpräparate. *Inaugural diss.*, Berlin, 1888.

they may be used in like concentration with zinc, starch, and lanolin or vaselin basis. For insufflations the sodium and potassium salts are used undiluted; the zinc with milk sugar, ten per cent.; the mercury salt, five to ten per cent. with milk sugar.—*The Medical Chronicle*, October, 1888.

CHEMISTRY OF BUCHU LEAVES.¹

By Y. SHIMOTAMA.

Flückiger obtained from the oil of buchu leaves a peculiar compound, described under the name of diosphenol; it forms colorless crystals belonging to the monoclinic system, which can be obtained several centimetres long by sublimation. It is easily soluble in alcohol, less so in ether, and scarcely at all in water. Its solutions are neutral. Diosphenol dissolves in concentrated sulphuric acid; on saturating the solution with barium carbonate and evaporating the filtrate, a little amorphous barium salt is obtained. According to Spica, diosphenol is an oxycamphor of the composition $C_{10}H_{16}O_2$; the author's results confirm this. *Methyldiosphenol*, obtained by the action of potassium hydroxide and methyl iodide on diosphenol, is a colorless liquid, which boils at $232-235^\circ$, and has a sp. gr. of 0.985 at 15° . It is easily soluble in alcohol and ether, but not in water. Its composition is $C_{10}H_{16}O_2Me$. The corresponding *ethyl*-compound is also a colorless liquid insoluble in water, easily soluble in alcohol and ether, of sp. gr. 0.967 at 15° . Boiling point $270-272^\circ$. *Acetyldiosphenol* is obtained by mixing diosphenol with anhydrous sodium acetate and excess of acetic anhydride, and heating at 145° in a closed tube. The rectified product is a colorless, odorless liquid, which boils at $269-270^\circ$, although not without decomposition. Sp. gr. 1.032 at 20° ; easily soluble in alcohol and ether, but not in water. The compound is neutral, but after rectification has an acid reaction.

Long digestion of diosphenol with alcoholic potash partly converts it into *dioic acid*; this is separated from the liquid residue in the retort by the addition of hydrochloric acid dissolved in ammonium carbonate, treated with animal charcoal, and precipitated with acid. Dioic acid forms white, crystalline needles; its aqueous solution has an acid reaction; it neutralizes strong bases and liberates carbonic anhy-

¹Arch. Pharm. [3], xxvi., 408-417; reprinted from Jour. Chem. Soc., Nov., p. 1205.

dride from carbonates. It melts at 96–97°, volatilizes slowly on the water-bath, and decomposes when heated strongly, evolving a menthol-like odor. It is soluble in 122·7 parts of water at 18°, and 82 parts at 100°; easily soluble in alcohol, ether, chloroform, benzene and carbon bisulphide. Its composition is $C_{10}H_{18}O_3 + H_2O$. The barium salt, $(C_{10}H_{17}O_3)_2Ba + 5H_2O$, is soluble in 67·89 parts water at 17·5° and 19·7 parts at 100°, and also in alcohol. Over sulphuric acid it gradually loses its water of crystallization. The white, amorphous silver salt, $C_{10}H_{17}O_3Ag$, rapidly blackens on exposure to the light. It is scarcely soluble in water even at 100°. The sodium and ammonium salts are amorphous. The calcium and magnesium salts are white, amorphous powders, insoluble in water, whilst the strontium salt is easily soluble. The copper salt is light-brown, the iron salt red-brown; both are only slightly soluble in water. Diosphenol, when fused with potassium hydroxide yielded an acid agreeing in every particular with diolic acid, but melting at 86°, that is 10° lower; attempts to raise the melting point of the new acid by recrystallization were unsuccessful.

Reduction of diosphenol in alcoholic solution by means of sodium amalgam gave an oily substance, which was dissolved in aqueous ether and treated with sodium to reduce the diosphenol still remaining unacted on. The solution was then allowed to evaporate, when an oily liquid permeated with crystals was left. The crystals, prismatic in form, melt at 159°, are odorless, sparingly soluble in alcohol and ether, and the alcoholic solution does not give the dirty-green coloration with ferric chloride solution which diosphenol does. Its composition is $C_{10}H_{18}O_3$, and must be considered as the *diol alcohol*. The oily compound occurring with these crystals is probably $C_{10}H_{18}O$, the principal component of buchu oil, according to Flückiger, and described by Spica under the name of diosmeleoptene. Diosphenol dissolved in carbon bisulphide and treated with bromine gives fine yellow crystals of the composition $C_{10}H_{14}Br_2O_2$; these melt at 43°, and are soluble in alcohol and ether, but not in water.

Grindelia robusta in chronic bronchitis.—Dr. Paul has obtained good results from extract. *grindelie robustæ* fluid. in chronic bronchitis, both the idiopathic form and in that complicated with asthmatic attacks, in doses of 45 to 60 minims daily.—*Deut. med. Woch.*, 1888, No. 6.

KAURI GUM INDUSTRY.

BY RALPH ROBINSON.

It was a fine summer morning in March when our little party of two ladies and one gentleman set off on a trip to the west coast of the North Island. There being no railway or other conveyance to Karè Karè we had to do what others do under similar circumstances, namely, walk or ride (we preferred the former) the greatest portion of the way, carrying with us some provisions, tin cans for boiling and cooking, tin pannikins and plates, a few other articles and as few clothes as possible, the whole fastened up lightly in rugs or blankets and slung on the shoulders knapsack fashion. Having gone as far as we could by rail we alighted, and after adjusting our swags, as this kind of luggage is usually called, we commenced our journey over the lofty ranges separating the east coast from the west. The first two miles was through cleared and partly cultivated lands, apples and other fruits growing to great perfection on this clayey soil. Then a mile or so of ti-tree scrub, *Leptospermum scoparium* (Captain Cook's tea tree), bearing a large quantity of rosaceous white blossoms, even when only a few inches high. It grows quickly and attains a height of twenty feet or more, and is principally used as fuel. Here and there may be seen a settler's wooden house, comfortable enough in summer, but misery in wet weather; fortunately there is no snow so far north, and no frost to speak of. On reaching the bush proper (primeval forest) a scene presents itself which gives the impression of even nature having gone wild. An undergrowth of almost impenetrable thickness, interlaced here and there with the supplejack ropes, *Rhipogonum scandens* (Maori name—Kariao), the root of which is not very unlike sarsaparilla, and is sometimes substituted for it by herbalists. Then there is the *Corynocarpus laevigata* (Maori name—Karaka), with its glossy green leaves and yellow berries; the seeds are an irritant poison, producing convulsions and contortions of the limbs. When any of the Maori children had eaten any of these seeds, their parents used frequently to cure them by administering emetics and burying them up to the neck in earth, to prevent contortions. After being steeped in water several weeks the seeds form a portion of the Maori diet. We also noticed several tall specimens of *Dacrydium cupressinum* (Maori name—Rimu), with its fern-like foliage. The tree yields an astringent gum, and the bark is used by the natives as a styptic. In many

cases the trees are encircled to the very top with the *Metrosideros robusta* (Maori name—Rata). In several cases the tree had succumbed and decayed, leaving a large hollow shell of interlaced rata. Here and there was left a noble kauri, the *Dammara australis*, one of which measured upward of 32 feet in circumference. The largest known specimen in the colony measures about 72 feet in circumference, reaches a height of 80 feet without a single branch, and is estimated to have taken about two thousand years to grow.

There were many other trees in an advanced state of decay, covered with parasites, which gave them a very weird appearance. Hillsides covered with tree ferns, *Oyathœa medullaris* (Maori name—Punga), hundreds or perhaps even thousands standing close together, with here and there a nikau palm with its pinkish flowers or red berries attached to the base of the leaves. The umbrella and scented ferns were also in abundance. The first half of our journey being completed at a place known as Big Muddy Creek, but on this occasion a small stream of very clear water, we halted and soon had a supply of hot tea and a fair supply of solids as lunch. The other half of the journey was very like the first half, until we reached the west coast with its rocks and boiling surf as far as the eye could see. It is common here on such excursions either to sleep out in the open air or to make use of an uninhabited gumdigger's hut, or disused wharè, not always the most desirable abode, as in many cases you are brought in contact with too many bed-fellows in the shape of fleas. But Karè Karè has its idle saw mill and workmen's empty huts, in one of which we took up our abode. The furniture consisted of a rough kind of table, a form, and one or two boxes. Our beds were made on the floor of the wiry climber, *Lygodium articulatum* (Maori name—Mangemangè), a few ti-tree twigs and rugs. Our cooking utensils were of the simplest description, tin cans (billies) and a few preserved meat tins playing a very important part. It was here we met with a camp of gumdiggers and had the opportunity of gaining most of the little information here given relative to the Kauri gum industry. They go out in parties of three or more, carrying with them their spades, spears, and bags, or they may have left their spades in the bush the night before. They usually went to their work between seven and eight o'clock in the morning, returning again about four o'clock in the afternoon, bringing with them what gum they had got. Friday was usually clearing up day, that is, they sorted and scraped their gum and bartered it in re-

turn for stores to the caretaker of the sawmill, drawing the balance in cash or cheque before going to town. The storekeeper in his turn sold it to the gum merchant.

There are two kinds of gum fields, the summer and the winter. It is usual to work on the ridges, that is, the higher ground, during the winter months, because then the rain softens the hard clayey ground and makes the labor much lighter; but in summer, when the ridges become too hard and the low-lying swamps sufficiently dry, they transfer their operations to them. The gum is found much nearer the surface on the ranges than in the swamps, being only a few inches below the surface, and sometimes even projecting above, whilst in the swamps it may be found to a depth of several feet, the soil of the higher ground having been washed away with the heavy rains and deposited in the swamps, burying the gum deeper each successive year. The spear is a sharp pointed steel rod with a wooden handle, and this is thrust down into the earth to ascertain if gum is present. If gum is proved to be present, then digging commences and the whole spot dug over until they suppose they have got all the gum out. It usually occurs in very irregular, rough pieces, about the size of a hen's egg, looking like a piece of very rough clay. This, when the outside is scraped off with a pocket-knife, is the Kauri gum usually met with in commerce, and worth about 35s. per cwt. on the spot. The smaller pieces are only washed and dried and do not bring nearly such a good price. As a rule the scrapings are not saved, not being worth more than 20s. for a large sackful. They are used for lighting fires and making fire lighters. The gum fusing and burning soon sets the sticks and logs on fire, the gum giving off a white smoke and aromatic smell. Sometimes very large pieces, a cwt. or more, of transparent and almost colorless gum are found near the decayed root of a tree, probably the gum of the original tree. This brings a very much higher price, and is used for making personal ornaments. It is easily worked with a knife into any shape, and polished with a soft rag and kerosine oil. At times large masses of the gum may be found exuding from the living tree, but this gum is not so good for varnish-making as the fossil gum. Three or four thousand men are usually engaged in digging and can earn in districts where the gum is fairly plentiful 30s. to 40s. a week, and, as the cost of living is very small, they could easily save money; but, being cut off from all civilization whilst at work, they speedily spend and waste all their savings when they go to town.

The gum is also found in considerable quantities, but of dark color, in the coal deposits, showing the antiquity of the Kauri forests. There were 4920 tons of gum exported from Auckland in 1886, the value of which was £257,653, being at the rate of rather less than £2 12s. 0d. per cwt. The gum was dearer then than now, and there is the cost of packing, sorting, warehousing, carriage from the gum fields, and other expenses to be added to the first cost. The Kauri gum industry is confined to the North Island, as it is only in the north that the Kauri pine grows; thus the unemployed of Auckland are not so badly off as those in the south, always having the gum fields to fall back upon as a last resource; a last one on account of the hardships to be gone through, especially when there is a wife and family, and because an inexperienced digger may be a long time before he finds gum enough to find him with food. A very large portion of the Kauri forest having passed into the hands of a syndicate, it is very probable the gum digging will be regulated, and in all likelihood the price of the gum will advance. AUCKLAND, New Zealand.—*Phar. Jour. and Trans.*, Oct. 20, 1886, p. 306.

MARGOSA OIL.

By C. J. H. WARDEN,

Chemical Examiner to the Bengal Government.

Margosa oil is the oil extracted from the almonds of the *Melia Azadirachta*, natural order Meliaceæ, a tree common in India, and known under the name of "Nim." The bark, leaves, fruit, and oil are held in high esteem by native and many European practitioners as remedial agents of value, a tincture and a decoction of the bark and a poultice of the fresh leaves being officinal in the Pharmacopœia of India. Preparations of the bark are considered effectual as antiperiodics, chiefly in the milder forms of periodical fever, and as tonics in convalescence after febrile and inflammatory affections.¹ The poultice of "nim" leaves is a common domestic remedy with natives, and is used as a stimulant application to indolent and ill-conditioned ulcers. The oil is used as an external application in rheumatism and as an anthelmintic, and is reported by Dr. A. Hunter to be an insecticide.²

¹ Appendix to Pharmacopœia of India.

² *Ibid.*

Margosa bark was examined by Cornish in 1857,¹ who isolated an alkaloid, which he described under the name of "margosin." The later researches of Broughton,² however, indicate that Cornish's bitter alkaloid is probably an amorphous resin. From the bitter oil of the seeds Cornish extracted an acid which he termed "margosic acid," but which he doubted to be capable of affording crystallizable salts.³ Lepine,⁴ who examined the oil, found it to have a specific gravity of .921, and he describes it as possessing a bitter taste and a garlic-like odor, to congeal at $+7^{\circ}\text{C}$., and to yield by saponification 35 per cent. of fatty acids, melting at 30°C ., and 65 per cent., melting at 44°C . Subsequent writers on Indian materia medica have quoted Lepine's results, but as far as I am aware no additions to Lepine's results have been published.

The margosa oil used in the investigation described in this communication was obtained by expression in my laboratory; there can therefore be no doubt regarding the genuineness of the sample. The fruit was washed to separate pulp, the stones dried, cracked, and the almonds exposed to a gentle heat for some time to remove moisture. The dried almonds were then crushed, placed in a cloth bag, and the oil expressed. It was found very necessary to first dry the almonds before subjecting them to pressure; without adopting this precaution a white creamy fluid was obtained, instead of clear oil, from which it was subsequently impossible to separate the oil, except by ether or other solvent.

The oil thus obtained was filtered through filter paper before it was examined. Directly after filtration the oil, when viewed in bulk, had a slight greenish coloration by transmitted light, owing to some of the almonds not having been quite ripe, and to solution of traces of chlorophyll in the oil. Viewed in a thin stratum the color of the oil was yellowish. The oil possessed a powerful garlic-like odor, and was very bitter. The specific gravity at 15.5°C . was 9235; at about 10° – 7°C . the oil congeals, without losing its transparency. After standing for about thirty-six hours the recently expressed oil deposited a white sediment, which examined microscopically was found to be amorphous.

¹ 'Indian Annals of Medical Science,' iv.; AMERICAN JOURNAL PHARMACY, 1858, p. 128.

² *Pharm. Journ.*, June 14, 1873.

³ 'Pharmacographia.'

⁴ Gmelin's 'Handbook of Chemistry,' vol. xvii., p. 94.

The color reactions of margosa oil were not characteristic. With concentrated sulphuric acid a rich brown color was yielded, and a strong garlic odor evolved. By Massie's test with nitric acid the oil became almost immediately of a reddish color; after standing about one hour and thirty minutes the color was pale yellow. The elaidin reaction conducted according to Pontet's directions yielded a solid firm yellowish product after eighteen hours, the temperature in the laboratory varying between 89° and 93° F. Exposed in a thin layer on a glass plate to a temperature of 100° C. for some days the oil did not dry or become tacky. The oil was easily soluble in ether, chloroform, carbon bisulphide, benzol, etc. Absolute alcohol agitated with it was colored greenish; on separating the alcohol, and evaporating off the spirit, an extract was obtained which consisted of oil, from which a small residue, whitish in color, separated on standing. The alcoholic extract was very bitter, and possessed in a marked degree the peculiar odor of the oil. The whitish residue deposited from the oil, separated by alcohol and examined microscopically, did not appear crystalline. Margosa oil after repeated agitation with alcohol was found to have lost its bitterness and almost wholly its alliaceous odor.

A known weight of the oil was saponified with alcoholic potash, the alcohol completely evaporated off, and the soap dissolved in water. On agitating the aqueous solution of the soap with ether, 1.60 per cent. of ether extract was obtained of an orange-yellow color and bitter. This extract treated with 60 per cent. alcohol, left a small amount of white residue, which had the character of a wax. The aqueous solution of the soap, after separation of the ether, was heated for some time to remove dissolved ether, the solution was then mixed with dilute sulphuric acid in excess, and the insoluble separated from the soluble fatty acids in the manner recommended by Allen.¹ The soluble fatty acids amounted to 3.519 per cent., the insoluble to 89.128 per cent. The volatile acids consisted of butyric and a trace of valeric acid. During the distillation to separate the fluid from the volatile fatty acids, a small amount of a snow white fatty acid passed over; this acid had a melting point of 43.6° C., which corresponds with the fusing point of lauric acid. A weighed portion of the insoluble fatty acids, from which the lauric acid had not been separated, was dissolved in alcohol, and titrated with normal standard soda, using phenolphthalein as an indicator, .288 gram of the acids required

¹ 'Commercial Organic Analysis.'

1 cc. of caustic soda for neutralization. No attempt at separating the fixed fatty acids was made; they probably consisted of a mixture of stearic and oleic acids, with a small amount of lauric acid.

Examined by Reichert's distillation process, 2.5 grams of the oil gave a distillate which after separation of the lauric acid, which had distilled over, required 4.6 cc. of decinormal soda for neutralization, phenolphthalein being used as an indicator.

The saponification equivalent of the oil was determined by Koettstorfer's method, and was equal to 284, the percentage of caustic potash required to saponify the oil being 19.72.

A preliminary examination of the oil having indicated the presence of sulphur, a quantitative estimation of the amount present was made and found equal to .427 per cent. The oil after repeated agitation with alcohol was found to contain only .109 per cent. of sulphur.

The extract obtained by agitating the oil with absolute alcohol has already been referred to; it was examined in the following manner:—The oily extract was treated with 60 per cent. spirit, allowed to stand, and the clear yellow alcoholic solution decanted from the insoluble oil; the alcoholic solution thus obtained was evaporated to dryness, mixed with ammonia, and agitated with ether. The ether solution was marked A. The aqueous solution, after separation of the ether, was mixed with dilute hydrochloric acid, and again agitated with ether. The ether separated of a yellow color, and below it some flocks of a dirty yellow hue, which refused to dissolve after prolonged agitation. The ether solution was marked B. From the aqueous solution the insoluble flocks were separated by filtration and marked C. The filtrate was not further examined.

Examination of ether solution A.—The solution was agitated with dilute hydrochloric acid, to remove any principles of an alkaloidal nature. The ether was then separated and evaporated; the resulting extract was pale amber in color, viscid at first, very bitter, and had a marked odor of the oil. It contained sulphur. It was easily soluble in 60 per cent. alcohol, ether, chloroform, etc., but insoluble in acids, or in caustic alkaline solutions. It had the properties of a neutral resin.

The hydrochloric acid solution was of a yellow color; it was mixed with ammonia, which occasioned a white precipitate, and agitated with ether. The ethereal solution on evaporation left a yellow residue, not readily soluble in dilute acids. The dilute sulphuric acid

solution was bitter, and yielded a precipitate with alkaline carbonates and hydrates, phosphomolybdic, and picric acids, potassio-mercuric iodide, chloride of gold and perchloride of platinum. This principle had therefore the properties of an alkaloid.

Ether solution B.—On evaporating the ether solution B, a dark reddish bitter extract was obtained, soluble in alkaline solutions, and re-precipitated in yellowish flocks by dilute acids. It had the properties of an acid resin.

Precipitate C.—The precipitate was well washed, and dissolved in alcohol; on evaporation a brittle darkish residue was obtained, soluble in alkaline solutions, reprecipitated in yellowish flocks by acids, soluble with very great difficulty in ether, easily soluble in chloroform. This principle thus also had the properties of an acid resin.

In addition to the principles above described as being present in the oil, an examination of the cake left after expression of the oil, indicated the presence of another neutral principle, insoluble in ether or alkaline solutions, but dissolving in chloroform.

Medical College, Calcutta.

—*Phar. Jour. and Trans.*, October 27, 1888, p. 325.

HYDRASTINE AND DERIVATIVES.¹

By E. SCHMIDT AND F. WILHELM.

Hydrastine. By Wilhelm.—The extract obtained by treating the coarsely powdered root of *Hydrastis canadensis* with water acidified with acetic acid at 100°, is evaporated to a syrup and excess of dilute sulphuric acid added, when berberine sulphate separates. The filtrate neutralized with ammonia gives a precipitate containing much hydrastine; this is separated, and on adding ammonia in excess to the filtrate a further precipitate is produced, which contains *canadine*. Both precipitates, boiled with ethyl acetate, give solutions which on cooling deposit hydrastine in large crystals, somewhat colored, but rendered pure by recrystallization. The crystals from the second ammonia precipitate are much purer than those from the first; by slow evaporation of the ethyl acetate solution they can be obtained as large as walnuts.

¹ *Arch. Phar.* [3], xxvi., 329-365; reprinted from *Jour. Chem. Soc.*, Nov., p. 1212.

Hydrastine picrate $C_{21}H_{21}NO_6 \cdot C_6H_5(NO_2)_3 \cdot OH + 4H_2O$, is thrown down as an amorphous, yellow precipitate, which is deposited from its boiling alcoholic solution in splendid yellow needles. By the action of ethyl iodide on hydrastine under pressure, a well crystallized ethiodide,



can be obtained of the form $\infty P \cdot \infty P \cdot \bar{P}^\infty \cdot (P \cdot \bar{P}^\infty)$, melting at 205° 206° . The corresponding chloride could only be obtained in a gummy mass; its solution was therefore precipitated with platinum and gold chlorides respectively, and the corresponding double salts were obtained and analyzed. Both are amorphous, the platinochloride being light red, melting at 207° , and having the composition



and the aurochloride being yellow, melting at about 110° , and having the composition $C_{21}H_{21}NO_6 \cdot EtCl \cdot AuCl_3$. *Hydrastine-ethylammonium hydroxide*, obtained by exactly precipitating the iodine from hydrastine ethiodide by means of silver oxide, concentrating the filtrate, and allowing to remain over sulphuric acid, appears as compact, slightly colored crystals, which are purified by recrystallization from hot water. Their composition is $C_{21}H_{21}NO_6 \cdot Et \cdot OH$, showing that the hydrastine has the character of a tertiary base, and does not, as Power supposed, belong to the imido-bases. The attempts to obtain a hydro-compound by the action of nascent hydrogen on hydrastine, both in acid and alkaline solution were unsuccessful. The evidence as to the existence of a third alkaloid, canadine, was doubtful.

Action of Oxidizing Agents on Hydrastine. By E. Schmidt and F. Wilhelm.—Hydrastine, when treated with manganese dioxide and sulphuric acid, yields *opianic acid* and *hydrastinine*. Oxidation with platinic chloride gives the same products. Potassium permanganate in alkaline solution produces *hemipinic* and *nicotinic acids*; in acid solution opianic acid is produced, as one of the authors had ascertained when Freund and Will's publication of the same fact first appeared. The base formed simultaneously was not isolated, but by employing barium permanganate hydrastinine in small quantity was obtained along with opianic acid. Chromic acid yielded the same two products.

Comparing *narcotine* and *hydrastine*, E. Schmidt considers that the former contains three methoxyl-groups, thus: $C_{19}H_{14}(OMe)_3NO_6$, whilst the latter contains only two, thus: $C_{19}H_{15}(OMe)_2NO_4$. Since

the oxidation of narcotine with manganese dioxide and sulphuric acid yields opianic acid and cotarnine, and under the same conditions hydrastinine gives opianic acid and hydrastinine; further, as opianic acid contains two methoxyl-groups, and cotarnine contains one of these groups, as shown by Wright, it follows that hydrastinine contains no methoxyl-group, and cotarnine may prove to be a methylated hydrastinine. The author hopes later to succeed in converting hydrastine into narcotine.

MINUTES OF THE PHARMACEUTICAL MEETING.

Philadelphia, Nov., 20th, 1888.

The meeting was called to order, Mr. Wm. B. Webb having been called to preside. On motion, the reading of the minutes of the last meeting was omitted. The secretary stated last month that a gift of some valuable works had been made to the library from the collection of the late Professor E. S. Wayne, of Cincinnati; at the time he was not aware that to the widow of the late professor a proper acknowledgement had already been made. The registrar stated that he had received a communication from Mr. A. L. Beck, of Sharon, Pa., a graduate of our college, of the year 1887; upon motion it was read. It is entitled "Chemistry in a Drug Store."

"For the encouragement and benefit of the students, and especially to the juniors, who have more time ahead of them, would I impress the importance of improving the opportunities offered by the laboratories. I am aware that the few notes I have to offer would not interest that class of students who only study just enough of each branch to "pull through" at examination time. They would not care to *waste* time or money on chemical apparatus or in the laboratory; while there are others that do not really appreciate the advantages of a thorough laboratory course, and think that one day a week, for a period, in handling reagents is sufficient for the present, and that they will do more in that line in the future; but as far as I have seen, they never do. I have been informed by traveling drug-men that very few druggists, including graduates in pharmacy, have a set of reagents or volumetric apparatus, or make any pretensions whatever to examine the drugs they buy. The only way I can account for this state of things, is, that having little or no experience in qualitative or quantitative analysis they have not enough confidence in themselves to undertake even easy determinations when they should have interest enough to lead them in that direction.

"Being located in an iron town of eight thousand inhabitants, of course the most profitable work for an analyst comes from the furnaces and mills, not all of which employ their own chemist. Aside from this the more frequent calls I have had, after making known I was prepared to do analytical work, have been in urinary analysis. I supplemented the excellent course in microscopy under Prof. Brown, by a special course in urinary histology at the

Jefferson Medical College under Prof. Rivley. These with Prof. Trimble's lectures to the class on urinary analysis, left nothing to be desired, and were well worth the time and money spent. The simple apparatus Prof. Trimble used for the estimation of urea is an illustration of how we learn by seeing or doing what we probably would overlook, or not attempt if left to find ourselves, or work out from the books. Urinary examination does not require much time and pays well. I never charge physicians more than half-price, and sometimes make no charge.

"Recently, after making a complete analysis of a mineral water found in Franklin, Pa., while I had my apparatus and reagents in order for the determination of organic impurities by Wanklyn's method, I concluded to offer to the School Board and citizens to determine the amount of chlorine (which I did volumetrically) and "free and albuminoid ammonia" for \$1.50 for each well, during the following week. I was surprised to get over twenty applications in the time stated. People will pay that amount to know what kind of water they use, who will not pay \$5 or \$6. Having everything in good working order I was able to complete duplicate analyses in about one hour and a-half, or easily do four a day and attend to other duties. The cost of materials was little and the experiment paid well for the time required. The Wanklyn method is not difficult, in fact easy, after having once gone through it under instruction; but it would be discouraging and uncertain to most persons who would attempt it even from the explicit directions of the author. Therefore one or two days in the laboratory under instructions would be more satisfactory than a week or more working it out for yourself. In fact this statement applies to the pharmaceutical and microscopical laboratories as well as to the chemical work-shop.

"I wish to mention the way I overcome the tendency of the flasks to crack during the distillation of the water. I place a piece of wire gauze about one-eighth inch below the flask, so that they do not touch, and have had no trouble since.

"Of course, a chemist is consulted on subjects as varied as Nature herself. Farmer Smith's crops failed; he wants the soil examined, if it won't cost over fifty cents. Neighbor Jones thinks his whiskey is drugged, because it affects his bladder. Brown finds fool's gold in digging his well; Black's chickens were found dead one morning, and he brings their stomachs over to be 'analyzed.' The barber brings a new hone to be examined with the microscope, to see if there are any flaws or rough spots in it. All would be pleased to have your services if it costs little or nothing. These are all actual facts.

"Interspersed with these comes work that pays. I will note a few: One person paid \$2 to know that a certain dough wall-paper cleaner was colored with red aniline. A confectioner some time ago brought me specimens of oils of lemon and peppermint, which he had bought for pure, and had paid a good price for. I put 10 cc. oil of peppermint in a graduated tube, and added 10 cc. of glycerin, shook thoroughly, and allowed to separate. The oil only occupied now 5 cc., while the alcohol it had been reduced with combined with the glycerin making 15 cc. The oil of lemon was 60 per cent.

It required about 15 minutes' time and a few cents' worth of glycerin. I charged only \$1, but secured a new customer.

"An Oil City man had red earth in his garden, and wanted to know what it was, and if it would make paint. It cost him \$10 to learn that most of the earth-paints were composed of ferric oxide or carbonate, such as his proved to be.

"Chemistry also pays in the store. A horse doctor here used considerable of a certain "spavin cure." I took a day to examine it, and now make it for him at a profit of \$1.20 a pint, instead of 30 cents, as before. I also examined a popular catarrh cure that has given good satisfaction, and now make one that proves just as good. I will note here that in the examination of the two last articles, and similar preparations, the knowledge gained in plant analysis is of inestimable value. It suggests methods of separation and identity, and is well worth the time and study bestowed on it.

"Recently, after standardizing some spirit of nitrous ether by Allen's method, I examined five samples from different retail stores. Two of them contained less than four-tenths of one per cent. (0.4 per cent.) of ethyl nitrite, one contained 1.2 per cent., one 2 per cent. and the best one 3.6 per cent. ethyl nitrite. In closing I will urge all who can, to get as much laboratory experience as possible, and they will never regret it. Aside from chemical analysis as a source of revenue, the ability to do such work secures the confidence of physicians in your capacity as a pharmacist, and elevates you above your competitors in the estimation of the public, making your microscope and analytical balance a better advertisement for your business than any other method known.

Yours, etc.

A. L. BECK, Ph. G.

Sharon, Mercer County, Pa., November 16, 1888.

Mr. G. M. Beringer on behalf of Mr. Bullock, presented a piece of the tree which furnishes the Canada balsam (*Abies balsamea*, Miller); this specimen exhibited very plainly the vesicles which contain the balsam.

Dr. Lowe stated that he had learned that grocers were selling essence of ginger put in two-and-a-half-ounce bottles for twelve cents, and that a lady made use of two bottles without the slightest relief.

A paper upon *Commercial Bicarbonate of Sodium* by Mr. H. J. M. Schroeter, was read. Prof. Maisch inquired if American brands were free from alumina, as formerly some did contain it. Mr. Schroeter said that it was examined and found to be free from that and all other metallic impurities.

Prof. Trimble read a paper upon *Shepherdia argentea*, or Buffalo berry, which is used as a food supply by the Indians. In reply to an inquiry it was stated that the shrub could be grown, probably without difficulty, east of the Alleghenies. Mr. Beringer said the reading of the paper reminded him of the puff-ball (*Lycopodium solitum*), or tuckahoe, which contains a large amount of pectin. Prof. Maisch said that in times of food scarcity it had been used as food, but it would not be very palatable.

Prof. Maisch read a paper from Mr. Greenawalt upon the use of the blue flower of *Iris versicolor* as a test for acids and alkalies. He also gave some results of the investigations thus far made upon the blue and red colors of

flowers, and stated that the changes occurring in botanical specimens on drying seemed to indicate that the blue colors of flowers were not alike. Mr. Beringer said, that some blue flowers faded readily on drying, while others became deep blue. Professor Trimble thought that one reason why chemists did so little work on the coloring matters of flowers was the extreme difficulty that attends the subject.

The meeting then adjourned.

T. S. WIEGAND,
Registrar.

EDITORIAL DEPARTMENT.

The next meeting of the American Pharmaceutical Association is to be held next year in San Francisco. Since the adjournment of the last meeting a number of members, who were not present at Detroit, have expressed their intention of going to the Pacific coast next year, and we think that, as far as numbers are concerned, the prospects are that as many members will undertake the journey of several thousand miles, as have usually been in attendance at the annual meetings from a distance of five hundred miles and over. An important point will be the decision upon the date, which among other things, has been entrusted to a committee from whom the following communication has been received, which will explain itself. We would urge upon all, who intend to go to the San Francisco meeting to promptly communicate with the chairman of the committee in compliance with his request, and in furtherance of the object:—

DEAR SIR.—The Committee on Arrangements for the next meeting of the American Pharmaceutical Association, which will be held in San Francisco, desire an expression of opinion from the members interested in the date of this meeting as to the most suitable time for holding it.

Serious objections have been offered to June, the time which at first seemed to be most favorable, mainly on account of it being a busy season in most of the large cities; some object on account of State association meetings. Our California friends say they prefer June, but that any time will suit them that will enable the largest number of Eastern members to visit them; the earlier the date the more pleasant the season to visit the Pacific Coast. September, the usual time of meeting, seems to be the most objectionable, and for various reasons, but principally on account of the opening of the schools and colleges, which would deter many of the members from going to California at this season.

From present indications Monday, July 15, appears to be the most favorable time.

If there are any objections to this date, members are requested to immediately communicate with the undersigned, and name the date they consider most favorable.

It may be here incidentally mentioned that the necessary cost of the trip to San Francisco for those East of the Mississippi, and to return home as they would from a meeting in the East, will probably not exceed \$150, and for \$200 each they can visit a number of places of interest contiguous to the route. A little more expense will be incurred if a visit to the Yosemite Valley is included.

This statement is made on the authority of a representative of different railroad lines.

EMLÉN PAINTER,

Chairman Committee of Arrangements.

Broadway and 34th street, New York.

The California College of Pharmacy held its sixteenth annual commencement at Odd Fellows Hall, San Francisco, on the evening of November 20, when the President of the University of California, Horace Davis, conferred the degree of Graduate in Pharmacy upon the following:

Adolph G. Bussenius,
Edward P. Driscoll,
George E. Flint,
Charles C. Higgins,
James H. McCarthy,
Frank B. Petrie,
Frank W. Ralston,
William K. Sanborn,
William H. Topley,

John F. A. Delicat,
Horatio B. Emerson,
David L. Henderson,
Harry D. Kelsey,
James J. Molony,
Philip J. Perkins,
George A. Root,
Ernest J. Thevenet,
Thomas J. White.

Addresses were delivered by Messrs. Horace Davis, F. H. Melvin, President of the California Pharmaceutical Society, F. W. Ralston and Prof. Runyon, the latter awarding also the prizes consisting of a gold medal to W. K. Sanborn; *Encyclopædia of Chemistry*, to H. B. Emerson, and various scientific books to W. K. Sanborn. Mr. G. J. Harvey was the recipient of the junior prize, consisting of lecture tickets to the senior class.

Limitations of a Druggist's Right to Sell Liquors Without Paying Special Tax.—Our attention has been called to the *Internal Revenue Record*, May 21, 1888, containing the following decision in relation to the sale, by druggists, of alcoholic preparations:

Treasury Department,
Office of Internal Revenue,
Washington, May 11, 1888.

HON. HENRY W. BLAIR, U. S. N.,

Sir:—In reply to your verbal inquiry, I would say that under the provisions of Section 3246, R. S., amended, a druggist is permitted to keep spirits and wines, and use them in combination with drugs, in the preparation of medicines that are not beverages, and to sell such medicines, without paying special tax as a liquor dealer under the internal revenue laws of the United States. But, under the uniform rulings of this office, and the decisions of the United States Courts, he cannot, without subjecting himself to this special tax, sell spirits, or wines, that are not combined with drugs or materials of any kind taking these liquors out of the class of beverages, even when he sells the liquors on a physician's prescription and for medicinal use only. Besides the medicinal compounds which a druggist is authorized to sell without paying special tax as a liquor dealer, although they contain alcoholic liquors, there are other compounds, containing spirits, which, while they are not medicines, are non-potable articles which do not

come under the head of "distilled spirits, wines, or malt liquors," in contemplation of the internal revenue laws, and which therefore he is entitled to sell without paying special tax, *e. g.*: Toilet articles, such as cologne and bay rum; ether and alcohol for use in photography; benzin or ether, and alcohol, for cleaning purposes; castor oil and alcohol for toilet use; Florida water, violet water, etc., toilet articles made from alcohol; alcohol and camphor; alcohol and ammonia and whiting, a cleaning preparation; alcohol and shellac, for painters.

Wyeth's Malt Extract, which is held out as a medicine, has been represented, under oath, by the druggists who manufacture it, as containing the chemical principles diastase, dextrin, maltose, in such strength as would produce nausea, if it should be used as a beverage.

This and other like extracts of malt, held out as medicines and not as beverages, are to be regarded as medicines until the facts brought before this office by the collector show that they belong in the class of malt liquors (beverages) referred to in Section 3339, R. S. Meanwhile druggists who sell them in good faith as medicines only are not to be called upon to pay special tax as dealers in malt liquors on account of such sales.

As to the compounds called "bitters," and "tonics," etc., the rule is that, if they are composed of spirits in combination with drugs, herbs, roots, etc., and are held out as remedies for diseases stated in labels on the bottles, they are to be regarded as medicines until the facts ascertained as to the purpose for which they are usually sold and used show them to be beverages; and, until such facts are obtained, druggists and merchants who do sell these compounds in good faith as medicines only, are not required to pay special tax as retail liquor dealers on account of such sales.

Every person who sells them as beverages, either by the bottle or by the drink, or sells them knowingly to those who buy them for use as beverages, involves himself in liability to criminal prosecution under the internal revenue laws, unless he holds a special tax stamp as a liquor dealer covering such sales (*U. S. v. Frederick Cota*, 29 *Int. Rev. Rec.*, 249; *U. S. v. Stafford*, 30 *Int. Rev. Rec.*, 247; *U. S. v. J. W. Bibb*, 33, *id.*, 391).

I send to you herewith at your request a copy of the Internal Revenue Record of January 17, 1887, containing this ruling, and also a copy of the Record of January 30, 1888, containing the decision of the Supreme Court of Maine on the question of the use of a United States special tax stamp, held by a person as a liquor dealer in a State, as evidence against him in a trial under the State's prohibitory law. Respectfully yours,

E. Henderson,

Acting Commissioner.

INDEX.

TO VOL. LX (VOL. XVIII, FOURTH SERIES), OF THE
AMERICAN JOURNAL OF PHARMACY.

<i>Abbott, Helen C. De S. & H. Trimble.</i> Occurrence of solid hydrocarbons in plants.....	321
<i>Abies</i> , formation of resin in.....	506
<i>Abstractum jalapæ</i> , preparation from resin.....	379
<i>Abstractum rhamni purshianæ</i> , formula for.....	608
<i>Acacia arabica</i> yields amrad gum.....	458
catechu, formation of catechu.....	508
<i>Acalypha</i> , <i>betulina</i> , <i>A. indica</i> , medicinal use.....	338
<i>Aceras anthrophora</i> , properties of.....	347
<i>Acetanilid</i> , comparison with antipyrin.....	365
comparison with solanine.....	345
detection in phenacetin.....	408
test for (Flückiger).....	176
<i>Acetates</i> , estimation of formates in.....	181
<i>Acetum ipecacuanhæ</i> , Brit. For.....	516, 588
<i>Acid acetic</i> , estimation of formic acid in.....	181, 149
benzoic, injurious in aliments.....	616
boric, innocuousness.....	289
pulverization of.....	289
bursic, in shepherd's purse.....	386
capric, new source of, in wool fat.....	14
carbolic, decolorization of.....	176
carbonic for freezing mixtures.....	582
liquid, uses of.....	268
chromic, non-deliquescent, preparation of.....	204
citric, presence in milk.....	513
reaction with chromate.....	452
with glycerin, distillation yields pyruvin.....	14
creasylic, or creasyol, an antiseptic.....	510
diolic from oil of buchu.....	624
formic, detection in acetic acid and acetates.....	181
gymnemic, properties of.....	389
helvellic, in <i>Morchella esculenta</i>	189
hemipinic from hydrastine.....	684
hydrochloric, test for, in gastric juice.....	240
nicotinic from hydrastine.....	684
nitric, detection of, in water.....	611
reduction of, by bacteria.....	254
strength of commercial.....	268
omicholic, in urine.....	567
opianic, from hydrastine.....	684
oxynaphtoic, as a disinfectant.....	275
phosphomolybdic, for estimation of alkaloids.....	528
phosphoric glacial, pure, process.....	242
photosantonin, action of.....	260

Acid salicylic, antipyretic action.....	368
artificial, purity of.....	526
behavior with permanganate.....	249
detection in beverages and foods.....	399
effect on health.....	108
santonin, action of.....	280
sulpho-carbolic, value as a disinfectant.....	297, 454
sulphuric, manufacture from calcium sulphate.....	449
free, test for (furfural).....	560
tartaric, reaction with chromate.....	452
Acids, action on zinc containing lead.....	20
and acid salts, action upon syrup. aurant. amar.....	99
Aconitine crystallized, maximum dose.....	100
estimation by Mayer's reagent.....	489
test for, sugar and sulphuric acid.....	247
Aconitum Napellus, strength of different varieties.....	585
Agar-agar, substitute for gum arabic.....	150
Air, exhaled, toxicity of.....	568
Albumin in urine, Tanret's reagent.....	406
Alcohol methylic, purification.....	129
use for burning.....	268
use for liniments.....	208
Alcohols, commercial, detection of impurities.....	509
Alfalfa and alfilaria as bee feed.....	127
Aliment, a complete, to replace meat powders.....	288
Aliments, antiseptics (benzoic acid) injurious.....	616
Alizarin, leuco-body of, anthrarobin.....	258
Alkaline earths, action of phosphates on.....	617
Alkaloids, detection after death.....	569
estimation with Mayer's reagent.....	487
estimation with phospho-molybdic acid.....	528
in human urine.....	567
in urine, Tanret's reagent.....	406
test for, sugar and sulphuric acid.....	247
Allen, A. H. Detection of saccharin in beer.....	359
Alum, porous, preparation.....	568
American Pharmaceutical Association, 86th annual meeting....	374, 427, 520
87th annual meeting.....	638
Ammonium borate, use in colic.....	140
use in phthisis.....	243
Amrad, East Indian gum.....	301
Amyl nitrite, tertian, action of.....	406
Amylene hydrate, properties of.....	584
Anagyris fetida, constituents of seeds.....	237
Analgesin. See antipyrin.	
Andira, formation of araroba.....	506
Aniline, case of poisoning.....	563
Anogeissus latifolia yields ghati gum.....	458
Anthemis nobilis contains solid hydrocarbon.....	322
Anthocyan in flowers and berries.....	601
Anthrarobin, preparation and properties of.....	258
toxicity of.....	239
Antifebrin. See acetanilid.	
Antifungine is borax.....	5
Antipyretics, history of.....	361
Antipyrin, abuse of.....	585
characters of.....	413
comparison with solanine.....	845

Antipyrin dangerous character.....	180, 240,	407
hæmostatic.....		265
preparation and properties.....		363
Antiseptics, action on diastase.....		357
injurious in aliments.....	108, 399,	616
Antithermin, an antipyretic.....		365
Apocynum cannabinum, medical uses of root.....		581
structure, analysis, etc.....		168
Apprentices, training of.....		379
Aqua capsici, preparation.....		408
chloroformi, anæsthetic effect.....		408
antiseptic action.....		475
naphtholi, preparation and use.....		276
piciis, use of.....		408
rosæ, irritating precipitates from.....		558
Arabinose, bi-rotary power.....		450
Araroba, origin of.....		506
Arenaria rubra, use in Algeria.....		848
Arganine, alkaloid from argan tree.....		564
Arsenic, compounds with iron, solubility of.....		563
in bismuth salts.....		529
iron as antidote for.....		563
test for, (aluminium).....		616
Asarone, chemistry of.....		304
Asarum canadense and europæum, constituents of oils.....		236
Aspidium marginale, analysis.....		229
Astragalus species as locoweeds.....		528
Atropine formed from hyoscyamine.....		400
in pilocarpine poisoning.....		410
Bacteria, reducing and oxidizing properties.....		254
Baird, Rob. Isinglass.....		607
Baker, E. G. Recent researches in botany.....		46
Balsamodendron, formation of gum resin in.....		506
Balsamum antarthriticum, secretion of.....		505
Bandages, corrosive sublimate, change of.....		562
Barium oxide, action of phosphates on.....		618
Batjontjor, Batiator or Vernonia nigritiana, medicinal properties.....		347
Beam, Wm. and H. Leffmann, effect of food preservatives on action of diastase.....		356
Beck, A. L. Analysis of Ricinus communis.....		98
Chemistry in a drug store.....		635
Percolation of buchu leaves.....		137
Bell, J. E. S. Analysis of adulterations of commercial pepper.....		481
Honey production in California.....		126
Olive culture in California.....		124
Belladonna, Japanese, constituents of.....		235
Benedikt, R. and E. Ehrlich. Shellac.....		504
Benzoin, commercial, assay of.....		606
formation of resin.....		506
Berberine, estimation by Mayer's reagent.....		492
sulphate, commercial purity.....		561
Beringer, G. M. Adulteration of ground elm bark.....		552
Notes on essential oils of bay, pimenta and cloves.....		441
Photoxylin.....		225
Should formulas for elixirs be incorporated in Pharmacopœia.....		283
Syrupus lactucarii.....	70,	110
Blchy, Wm. Fluid extract of cascara sagrada.....		92

Binitrocreosol, and other colorants, to replace saffron.....	288
Bismuth iodide, preparation and properties.....	253
mixtures, mucilage not suitable for.....	247
oxyiodide, preparation of pure.....	388
salts, amount of arsenic in.....	528
subcarbonate, composition.....	387
subnitrate, composition.....	385
composition prepared with ammonia.....	445
Bleaching agents, action on writing ink.....	422
<i>Boa, P.</i> Note on tincture of quillaia saponaria.....	15
<i>Bond, Ira L.</i> Healing oil.....	609
Boni's blistering liquid, formula for.....	455, 615
Borneol, constitution of.....	309
physiological action of.....	620
Boswellia, formation of gum resin in.....	506
Botany, recent researches (Baker).....	46
Bottles, cleaning of, with porcelain shot.....	177
<i>Brandt, I. J.</i> Syrupus sarsaparillæ, etc.....	9
Brass utensils, process for marbling.....	615
British Pharmaceutical Conference.....	532
Bromides, solution; Erlenmayer.....	611
Brosmius brosmæ, acidity of oil.....	614
Brucine, estimation by Mayer's reagent.....	492
<i>Brühl, J. W.</i> Terpenes and their derivatives.....	307
Buchu, chemistry of.....	624
exhaustion of.....	109, 137
fractional percolation of.....	137
false.....	149
Buffalo berry see <i>Shepherdia argentea</i>	593
<i>Bunting, J. H.</i> Euphorbia pilulifera.....	552
Fluid extract of caulophyllum.....	73, 109
Burdock fruit, bitter principle of.....	79
<i>Burnett, J. F.</i> Jottings from a note-book.....	247
<i>Butlerow, A. and B. Rizza.</i> Asarone.....	304
<i>Butterfield, F. V.</i> Dispensing memoranda.....	18
Cadmium, action of phosphates on.....	619
Caffeine citrate, solubility of.....	538
estimation of, in guarana.....	244
sold as citrate.....	538
<i>Cailliet, L. and E. Colardeau.</i> Freezing mixtures containing carbonic anhydride.....	582
Calcium oxide, action of phosphates on.....	617
tartrate, limit test for, in cream of tartar.....	580
<i>Calycanthus glaucus</i> , alkaloid in seed.....	526
<i>Campbell, H.</i> Notes of incompatibilities in prescriptions.....	351
Camphene, characters of.....	308
Camphor, composition of.....	309
conversion into borneol.....	401
secretion of.....	506
Camphor-chloral, cantharidal, formula.....	455, 615
Canadine, alkaloid from hydrastis.....	634
Canadol as an anæsthetic.....	103
Capsella Bursa-pastoris, medicinal use.....	336
<i>Capsicum annuum</i> in India.....	457
Carbohydrates, tests for, furfural reactions.....	456
Carbon compounds, oxidation by potassium permanganate.....	255
disulphide, in oil of mustard.....	556

Cardamom plant, growth, climate, etc.....	366
Carduus marianus, medical use of fruit.....	511
Carmine solution, preparation of.....	586
Carnegie, D. J. Action of finely divided metals on solution of ferric salts.....	291
Cascara amarga, contains solid hydrocarbon.....	321
sagrada, constituents, ferment, ammonia, glucose.....	87
constituent of, emodin.....	516
Cassia marilandica, analysis (Schroeter).....	231
nictitans, analysis (Gallaher).....	280
Tora, analysis of seeds (Elborne).....	538
Catechu and gambier, comparison.....	497
secretion of.....	506
Cay-cay, the fat-tree of Indo-China.....	449
Cement, plastic, for hollow teeth.....	404
Cephaelis tomentosa, inefficiency of.....	539
Ceresin, detection in wax.....	402
Chardon Marie, use and dose.....	511
Chelidone, chemistry of.....	515
Chemicals, effects upon plant life.....	43
Chichipate, contains solid hydrocarbon.....	321
Chinoline, history of.....	362
Chloracetones, preparation and properties.....	81
Chloral, action upon certain mercuric salts.....	13
incompatibility with potassium cyanide.....	286
hydrate, use in rabies.....	11
hydrocyanide, physiological action.....	18
preparation and properties.....	273
Chloral ammonium, preparation and effects of.....	615
Chloralcyanhydrin, preparation and properties.....	273
Chlorobromo-acetones, preparation and properties.....	38
Chloroform as a preservative.....	248, 475
flavored with oil of cloves, uses of.....	558
tests for purity, etc.....	558
use of, against insect stings.....	177
Chocolates, assay of.....	277
Chrysanthemum cinerariæfolium, characters of.....	587
Chrysarobin, therapeutic substitutes for.....	257
Cichory in coffee, detection of, by amount of chlorine.....	400
Cinchona bark, mossed and shaved.....	149
Carthagen, history of.....	539
cultivation in Bolivia.....	310
hybridization, effect of.....	540
Cinchonas, home of.....	142
Cineol, composition of.....	308
Citrene, characters of.....	307
Clark, W. H. Grindelia robusta and G. Squarrosa.....	433
Modification of formula of tincture of ipecac and opium.....	226
Cobalt, action of phosphates on.....	619
Coca, assay of leaves.....	238
bases, contributions to knowledge of (Hesse).....	41
cultivation, varieties and uses of.....	199
Cocaine in coca leaves.....	43
Cocaine, test for purity.....	244
Cocamine in coca leaves.....	43
Codeine, test for, sugar and sulphuric acid.....	247
medical use of.....	403
Codfish salt, organic constituents of.....	99
Coffee, amount of chlorine in pure.....	400

<i>Oblardeau E. and L. Cailletet.</i> Freezing mixtures containing carbonic anhydride	582
Colchicum seed, assay of.....	101
Cold, instantaneous, substitute for application of ice	177
<i>Coles, C.</i> Chloracetones.....	31
Colleges of Pharmacy:	
Albany	217
Buffalo.....	217
California.....	218, 689
Chicago.....	218, 480, 589
Cincinnati.....	217
Louisville.....	218
Maryland.....	217
Massachusetts.....	374
New York.....	217
Philadelphia, (see Philadelphia)	
St. Louis.....	218, 374
Colleges of Pharmacy, extension of studies.....	589
Collodion, ichthyol, preparation.....	409
salicylic, formula.....	409
Cologne, superior, formula.....	102
Colophonium, detection of.....	611
Coloring matters, leucobodies of, effects of... ..	257
of flowers, blue and red.....	599, 638
Composition filling for repairing rubber goods.....	512
Condurango, use in stomach diseases.....	474
Congress, international, climatology and hydrology in Paris.....	479
medical, in Barcelona.....	381
pharmaceutical, in Barcelona.....	381
pharmaceutical, in Italy	269
Conicine, bromhydrate, use in treatment of tetanus.....	140
Coniine bromide, use in tetanic convulsions.....	406
Copaiba, use in croup.....	350
Copaifera species; secretion of copaiba.....	505
Copper salts, sensitive reagent to.....	141
<i>Coppola, F.</i> Physiological action of santonin and its derivatives.....	259
Corynocarpus laevigatus, poisonous seeds.....	626
Cosmetic, Pavesi's, formula for.....	616
Cotton, analgesic, cocaine and morphine.....	615
<i>Craine, W. M. C.</i> Unguentum hydrargyri.....	10
Cream, toilet, lanolin.....	562
Cressote, administration of.....	455
Creolin, commercial, properties of.....	276
preparation and composition.....	560
production of.....	275
Creolin-iodoform, an antiseptic.....	560
Cresylol, antiseptic properties of.....	510
<i>Crutcher, W.</i> Helianthemum canadense.....	390
<i>Curriden, G. A.</i> Potassii iodidum.....	279
<i>Culler, E.</i> Why not the pharmacists?.....	65
Cyanin in flowers and berries.....	601
Cyathæa medullaris in New Zealand.....	627
Cytisus Laburnum, medicinal properties.....	338
<i>Dacrydium cupressinum</i> yields gum.....	626
<i>Dammara australis</i> in New Zealand.....	627
Date shells, use of, in Algeria.....	348

<i>Davies, E.</i> Pepper and its adulterants.....	854
Dentifrice, formula.....	409
Dextrin, preparation, to replace gum arabic.....	98
an adulterant of extracts.....	138
Diastase, action of antiseptics on.....	857
influence of saccharin upon action of.....	27
Dichloracetone, preparation and properties.....	82
Digitalin, maximum dose.....	100
Dimethyloxychinizin, see antipyrin.	
Dinitrokresol, dangerous character of.....	177
Dioscorea villosa, analysis.....	554
Diosphenol, chemistry of.....	624
Dipentene, characters of.....	307
Dipterocarpus species, resin passages in.....	505
Dispensing memoranda (Butterfield).....	18
Distillation, prevention of concussions.....	103
<i>Dorland, W. A. N.</i> Ustilago maydis.....	51
Doses, reference table of.....	341, 391
<i>Dreyfus.</i> Rate of oxidation of carbon compounds by potassium permanganate.....	255
Drug business in Australia, India, and United States.....	104
Druggists' Mutual Fire Insurance Company.....	382
<i>Duncan, W. and I. W. Thomson.</i> Report on acetic extract of ipecacuanha, 264	
Eggs, salicylated, tests for.....	565
<i>Ehrlich, E. and R. Benedikt.</i> Shellac.....	504
<i>Elborne, Wm.</i> Jambul.....	368
Elixir, chlorhydro pepsic, formula.....	337
dentifrice, with saccharin.....	100
phosphori, Brit. For.....	516
saccharin, formula.....	182, 510, 516
terpin, formula.....	338
theine hydrobromate.....	280, 318, 382
yerba santa, aromatic, Nat. For.....	527
Elixirs, formulas, in the Pharmacopœia.....	288, 319
use of, in prescriptions.....	284
Elm bark, ground, adulteration.....	552
Embellia Ribes, medicinal use.....	340
Emetine, estimation by Mayer's reagent.....	493
Empleurum serrulatum, false buchu.....	149
Emulsio lanolini, preparation.....	103
olei chenopodii, formula for.....	545
olei gaultheriæ, Phil. Hosp.....	313
olei morrhuæ, Brit. For.....	517
olei morrhuæ, combinations, Phil. Hosp.....	313
olei ricini, Phil. Hosp.....	314
terebeni, preparation of.....	68
Enemata, nutrient, efficiency of.....	260
<i>England, Jos. W.</i> Bland's pills.....	173
Elixir of theine hydrobromate.....	280, 382
Emulsion of terebene.....	68
Permanent syrup of ferrous iodide.....	547
Reference table of doses.....	341, 391
Ephedra falcata, resin passages in.....	505
Ergot, drying and preservation of.....	556
of oats, activity of.....	388
Erodium cicutarium as bee feed.....	127
Erythrophleine, anæsthetic action.....	238

Erythrophleine in Haya poison.....	340
Eseridine, conversion of, into physostigmine.....	611
Ether, use as a parasiticide.....	108
Eucalyptus citriodora and persicifolia, odor of leaves.....	149
Eugenia Jambolana, analysis of.....	368
medicinal use of.....	389
Eupatorium perfoliatum, analysis of leaves.....	77, 109
Euphorbia pilulifera, analysis.....	552
Eupatorium purpureum, analysis of leaves.....	121, 149
Evans, C. B. Extractum rubifluidum.....	227
Exhibition, International, Brussels, medicine and pharmacy division...	150
Extract fluid, asarum, proper menstruum for.....	654
blackberry bark, menstruum for.....	227
cascara sagrada, tasteless.....	318, 538
cascara sagrada, formula for.....	92
caulophyllum, proper menstruum for.....	73, 109
cimicifuga, proper menstruum for.....	7
eriodictyon, menstruum for.....	74
hydrastis, precipitate in.....	561
lactucarium, for preparing syrup.....	73, 110
pycnanthemum linifolium, formula for.....	610
rhamnus purshiana, formula for.....	92
rubus, proper menstruum for.....	227
staphisagria, proper menstruum for.....	609
triticum, Brit. For.....	517
wild ginger, proper menstruum for.....	6, 54
yerba santa, proper menstruum for.....	74
Extraction by pressure.....	596
Extracts adulterated with dextrin	138
Extractum aconiti, yield of, and alkaloid in.....	402
belladonnæ, yield of, and alkaloid in.....	452
cascara sagrada, dispensing note.....	19
cocæ, use in painful affections of stomach.....	108
conii fructus, yield and quality of.....	555
glycyrrhizæ, commercial, process for assay of.....	607
quality of.....	607
hyoscyami, yield of, and alkaloid in.....	452
ipecacuanhæ, acetic, commercial.....	264
nucis vomicæ, yield and alkaloidal strength of.....	559
stramonii, yield of, and alkaloid in.....	452
Fabiana imbricata, alkaloid and fluorescent principle in.....	12
Falk, J. A. Drug business in Australia, India and U. S.....	104
Fat determination, in milk, cream, etc.....	516
peptonate, substitute for cod liver oil.....	586
Fats, digestion and absorption of.....	585
Fauna of the tomb.....	141
Faust, J. R. Tinctura vanillæ.....	9
Fel bovinum, dispensing note.....	19
Ferments, influence of saccharin upon.....	26
Ferns, apospory in.....	48
Ferri et quiniæ tartas, amorphous alkaloids in.....	539
Ferric chloride, vapor-density at various temperatures.....	296
oxide as antidote for arsenic.....	563
oxide, saccharated, presence of alkali in.....	241
peptonate, preparation of.....	514
salts, action of finely divided metals, and titration of.....	291
salts, administered hypodermically	181

Ferric solutions, action of cold upon.....	449
Ferrous iodide incompatible with potassium chlorate.....	404
tonic and alterative properties.....	146
unalterable solution.....	449
solutions, restoration of, by freezing.....	611
sulphate, precipitated, composition.....	485
Flashpowder, preparation of.....	245
Flour, lead poisoning from.....	148
oat, in treatment of burns.....	27
Flowers, blue and red coloring matters of.....	598, 687
Food preservatives, action on diastase.....	856
Formulae, new, from unofficial formulary.....	516
Fortuné, H. and F. Gay. Characters of dimethyl-oxychinizin.....	413
Frangula bark, constituents of.....	515
Frans, F. W. Analysis of leaves of Eupatorium perfoliatum.....	77, 109
Analysis of volatile oil of Hedeoma pulegioides.....	161
French journals, abstracts from.....	12, 98, 188, 178, 237, 286, 344, 404, 448, 510, 563, 614
Fuchsin, use in albuminuria.....	410
Fumaria officinalis in India.....	457
Fumigating wax, formula for.....	178
Furfuraldehyde, color reactions with.....	506
Furfural reactions for carbohydrates.....	456
Galactose, susceptibility to fermentation.....	450
Gallaher, Chas. S. Analysis of Cassia nictitans.....	280
Gambier, cultivation, preparation varieties.....	261
value as an astringent.....	497
Gastric juice, test for hydrochloric acid in.....	240
Gay, F., and H. Fortuné. Characters of dimethyl-oxychinizin.....	413
Gadus virens, acidity of oil.....	614
Gelatin, commercial, examination of.....	607
Gelsemine, estimation with Mayer's reagent.....	494
Gentianaceæ, character of flowers.....	47
German journals, gleanings from.....	102, 176, 244, 399, 451, 518, 555, 610
Ghati, East Indian drugs.....	457
Ghatti, and other substitutes for gum arabic.....	301, 457
Gingers, commercial, comparative value.....	278
Glass vessels, how to file.....	246
Globularia Alypum, use of.....	347
Glucose bleached by sulphurous acid.....	585
commercial, in Italy, impurities.....	287
reagent for (safranin).....	613
sweetened with saccharin.....	406
Glue, liquid, preparation.....	246
rendered insoluble by chromate.....	239
Glycerin and borax, effervescence.....	455
and citric acid yield pyruvin.....	14
test for, borax.....	514
Glyceritum calendulae, preparation of.....	609
ferri, iodi, olei ricini, Phil. Hosp.....	814
Glycyrrhizin, process for assay.....	607
Godefroy, L. Detection of impurities in commercial alcohols.....	509
Gott, S. B. and M. P. Muir. Bismuth iodide.....	258
Grains of paradise, detection in pepper.....	408
Grandiflorine, preparation from Solanum grandiflorum.....	450
Grenades, hand, composition of.....	268
Grindelia robusta, analysis (Fischer).....	440

<i>Grindelia robusta</i> , description and analysis (Clark).....	488
use in bronchitis	625
<i>squarrosa</i> , description and analysis (Clark).....	483
<i>Greenwald, W. G.</i> Iris test paper	598
<i>Grunevald, W. and V. Meyer.</i> Vapor density of ferric chloride at various temperatures.....	296
<i>Guaiacol</i> , administration and uses of.....	578
substitute for creasote.....	289
use in phthisis	410
<i>Guarana</i> , habitat and preparation of.....	286
yield of caffeine.....	244
<i>Gum arabic</i> , adulterated with dextrin.....	586
substitutes for.....	98, 150, 170, 301, 379, 406, 457, 510
resins, formation of	505
solutions, prevention of mould.....	403
Gums, mode of formation.....	505
East Indian, description and uses.....	301, 457
<i>Gunzburg's reagent</i> , preparation of.....	240
<i>Gurjun balsam</i> , secretion of.....	505
<i>Gymnema sylvestre</i> , effect of leaves upon sense of taste.....	336
Hair tonic, cinchona.....	102
tonic, quinine.....	480
Hand grenades, composition of.....	268
Haya poison, action and origin of.....	340
<i>Hayduck, Dr.</i> The antiseptic action of hops.....	25
<i>Rebsacker, W. F.</i> Commercial oxide of zinc.....	608
<i>Hedwigia balsamifera</i> , constituents and properties of.....	565
<i>Heisch, Chas.</i> Notes on senna.....	459
Hektograph mass, formula.....	402
<i>Helianthemum canadense</i> , analysis of.....	390
Helleborein as a local anæsthetic.....	346, 610
<i>Heraeus, W.</i> Reducing and oxidizing properties of bacteria.....	254
Hesperidin, decomposition by acids.....	287
<i>Hesse, O.</i> Contributions to knowledge of coca bases.....	41
Water of crystallization in morphine.....	566
Hexachloracetone, preparation and properties.....	37
<i>Hielbig, C.</i> Systematic examination of sulphate and hydrochlorate of quinine.....	411
<i>Harner, K.</i> Commercial tartar emetic.....	135
<i>Holmes, E. M.</i> Note on star anise.....	502
Honey production in California. See also Mel.....	126
Hops, antiseptic action of.....	25
Horse bean, flowers of, as a remedy.....	404
<i>Huber, J. E.</i> Purification of methylic alcohol.....	129
<i>Huechys sanguinea</i> , no cantharidin in.....	149
<i>Humiria balsamifera</i> , <i>H. floribunda</i> , substitute for copaiba.....	338
<i>Hunter, J. C.</i> Keeping qualities of spiritus ætheris nitrosi.....	349
Hydrargyrum, see Mercury.	
Hydrastine, estimation with Mayer's reagent.....	494
preparation and derivatives of.....	633
relation to narcotine.....	634
<i>Hydrastis canadensis</i> , medical uses of.....	178
Hydrocarbons, solid, occurrence in plants.....	321
<i>Hydrocotyle asiatica</i> , action of.....	339
Hydrogen binocide, as a styptic.....	103
pure, preparation from commercial article.....	447
Hydroquinone, dose of.....	511

Hygrine, characters of.....	44
Hygrophila spinosa, value in dropsy.....	189
Hyoscyamine change into atropine.....	400
Ice, substitute for external application.....	177, 243
Iceland moss for emulsifying oils.....	172
Ichthyol, use in rheumatism.....	267
Illicium verum, source of staranise, description.....	502
Incompatibilities in prescriptions.....	351
Indigo solution for ink.....	102
Infusum digitalis, preparation.....	408
serpentariae, dispensing note.....	20
Ink, writing, action of bleaching agents on.....	422
solution of indigo for.....	102
Insect powder, origin and quality of.....	587
powder, with naphthalin.....	108
stings, remedy for, chloroform.....	177
Iodoform, action upon certain mercuric salts.....	13
antidote for, sodium bicarbonate.....	246
as a hæmostatic.....	563
deodorized (menthol).....	13
Iodoformium bituminosum, preparation with tar.....	513
Iodol, poisoning with.....	8
Iodophenols, uses in dyeing.....	289
Ipecacuanha, powdered, assay of.....	529
Iris versicolor, test paper from flowers.....	598, 637
Irish moss for emulsifying oils.....	170, 379
Iron and strychnine citrate, not permanent in solution.....	348
arsenic compound, solubility of.....	563
chloride, vapor density of.....	296
compounds with arsenic.....	563
iodide, tonic and alterative properties of.....	146
unalterable solution.....	449
oxide, saccharated, presence of alkali in.....	241
process of preparation (Traub).....	15
reduced, quality of.....	186
salts, action of finely divided metals on.....	291
hypodermic administration.....	181
solutions, effect of freezing on.....	449, 611
utensils, process for marblizing.....	615
<i>Irvine, R.</i> Action of bleaching agents on writing ink.....	422
Irvingia harmandiana yields cay-cay wax.....	450
Isinglass, commercial, examination of.....	607
Japan, substitute for gum arabic.....	150
Isodulcin from hesperidin.....	287
Jalap, amount of resin in.....	379
substitute for, Pharbitis triloba.....	580
Jambul, use, description, etc.....	389, 368
Japan isinglass, substitute for gum arabic.....	150
wax, composition of.....	614
<i>Johnson, W. A. S.</i> Potato starch and other starches of commerce.....	596
Justicia procumbens, use in India.....	457
Kairin, or Kairoline, origin and uses.....	363
<i>Kalkyer, W. C.</i> Dioscorea villosa.....	554
Kauri, collection of, in New Zealand.....	626
<i>Keefer, C. D.</i> Aspidium marginale.....	226

Kefir, or milk wine, improved formula.....	176
Kephalgina, remedy for headache, composition.....	178
Kew, botanical work at.....	50
Kliebhau, G. Separation of resins.....	420
Kossel, A. A new base in tea.....	461
Koumis, preparation of, with honey.....	147
Labels, pharmacopoeial nomenclature for.....	525
Laboratory instruction, value of.....	635
Laburnum poisoning.....	248
Lactucarium, adulterated with bread crumbs.....	612
Lamna cornubica, acidity of oil.....	614
Lanesin, production from wool, and use.....	512
Lantana, use of, in Algeria.....	348
Lard, adulterated with cotton seed oil.....	537, 578
commercial, examination of.....	10
Larmuth, L. Properties and uses of sozoiodol.....	621
Laurene, characters of.....	308
Laurus Camphora, formation of camphor in.....	506
Lea, M. C. Combination of silver chloride with metallic chlorides.....	198
Lead, action of water on.....	250
chromate, absorption of.....	282
cases of poisoning before criminal courts.....	151
poisoning from flour.....	148
Leech, D. J. On guaiacol.....	578
Pryridine.....	418
Leffmann, H. and Wm. Beam. Effect of food preservatives on action of diastase.....	856
Leptospermum scoparium, the tea tree.....	626
Leuher, E. C. Fluid extract of cimicifuga.....	7, 54
Lice, plant, preparation for destroying.....	178
Liebermann, C. Therapeutic substitutes of chrysarobin.....	257
Lime, chlorinated, loss of chlorine.....	400
Limonene, characters of.....	307
Linimentum aconiti, ammoniæ, Phil. Hosp.....	314
antineuralgic, formula.....	409
arnicæ comp., chloroformi comp., Phil. Hosp.....	314
methyral, formula.....	343
olei succini, Phila. Hosp.....	314
salol for burns.....	409
saponis vir., terebinthinæ, terebinth. co., Phila. Hosp.....	314
Linseed mucilage, substitute for gum arabic.....	406
Lint, calendulized, preparation of.....	609
Liparin, composition of.....	243, 410
substitute for cod liver oil.....	243, 410, 586
Lippen, Harry. Abstractum rhamni purshianæ.....	608
Liquid, blistering, Boni's, formula for.....	455, 615
Liquids, easy method of finding specific gravity.....	67
Liquor acidi borici, ac. phosphor. co., ac. tannici, Phil. Hosp.....	314
antisepticus, Phil. Hosp.....	315, 560
arsenicalis, cure for warts.....	595
cinchoninæ, Dobellii, hydrarg. chlor. corr., Phil. Hosp.....	315
ferri albuminati, preparation.....	456
ferri dialysati, difference from oxychloride.....	556
ferri hypophosphitis fortis, Brit. For.....	517
ferri oxychloridi difference from dialyzed iron.....	556
ferri peptonati, preparation.....	514
hydrargyri chloridi corrosivi, introduction into U. S. P.....	174
iodo-tannici for hypodermic use.....	407

Liquor hypophosphitum comp., Brit. For.....	517
quinidine; sinci et aluminis, sinci sulphidis, Phil. Hosp.....	315
saccharin, Constantin Paul's.....	510
Van Swieten's.....	175
Liquors, sale of, by druggists without special tax.....	639
Listerin, composition of.....	245
Lloyd, J. U. Maize oil.....	325
Locoweeds not poisonous.....	523
Lotiones, Philada. Hospital.....	315, 316
Lozenges, santolin, examination of.....	244
Luffa species, various products from.....	332
Lapinus albus, vanillin from seeds.....	237
Lycoperdon solidum, use for food.....	637
Lycopodium adulterated with starch.....	586
constituents of.....	455
Lygodium articulatum in New Zealand.....	627
MacEwan, P. Note on sandalwood oil.....	182
Mack's paste, composition of.....	245
MacPherson, C. A. Notes on ipecacuanha wine.....	299
Magnesium , action of phosphates on.....	618
ammonium, phosphate, solubility.....	583
salicylate, use and preparation.....	242
Maisch, J. M. Blue coloring matter of flowers.....	599
Gleanings in <i>Materia Medica</i>	235
Notes on some new remedies.....	273
Notes on some old remedies.....	336
Practical notes from <i>Foreign Journals</i>	241
The genus <i>Luffa</i>	332
Malt of maize, oat, rye and wheat, saccharating power of.....	243
Mander, A. Ghatti and other Indian substitutes for gum arabic.....	301
Manganese, action of phosphates on.....	619
Mann, Dr. Preparation of hydrogen peroxide from commercial article.....	447
Marbleizing metal utensils.....	615
Marpmann, H. A new constituent of liver oil.....	570
Martin, J. A. Gleanings from German journals.....	102, 176, 244
Mastich, composition of.....	236
Matthews, W. E. Australian opium.....	45
Mayer's reagent for estimation of alkaloids.....	487
McDavitt, H. Reduced iron and iron pills.....	136
Meco-narceine, obtained from morphine.....	346
Medicago sativa as bee feed.....	127
Medicine and pharmacy at international exhibition in Brussels.....	150
section of, in pharmaceutical associations.....	67, 378
Medicines administered warm.....	178
Meer, H. F. and J. Le R. Webber. Examination of cascara sagrada.....	87
Mel depuratum, formula.....	399
rosatum, formula.....	557
Melia Azadirachta, chemistry of.....	629
Menthene, characters of.....	308
Menthiodol, use in neuralgia.....	400
Menthol, chemistry of.....	308
Menthon, conversion into menthol.....	401
Mercurammonium chlorides, preparation and properties.....	80, 109
Mercuric alaninate, preparation and properties.....	274
chloride, acid solutions, for disinfecting.....	146, 404
external applications, effects of.....	246
for bandages, soluble.....	562
permanent solution.....	407
cyanide, use in diphtheria.....	287
iodide in soap.....	553
use of, in tuberculosis.....	512

Mercuric phenylate, preparation and composition of.....	611
salts, action of chloral and iodoform upon.....	18
salicylate, preparation and formula of.....	612
properties and dispensing of.....	242
Mercurous bromide, crystallized.....	197
iodide, crystallized.....	197, 529
Mercury absorption by the skin.....	178
ammoniated, commercial, quality of.....	279
preparation and chemistry of.....	80, 109
detection in urine.....	512
iodotannate, formula for solution of.....	407
Metals, estimation and separation by sodium pyrophosphate.....	421
Methyl chloride, refrigerant activity of.....	248
Methylal, hypnotic value.....	12, 298
hypodermic dose.....	541
Metrosideros robusta in New Zealand.....	627
Meyer, V & W. Grunewald. Vapor density of ferric chloride.....	296
Meyers, H. J. Emulsion of oil of chenopodium.....	545
Michigan University, commencement.....	480
Müntzer, W. C. Extractum glycyrrhizæ.....	607
Milk, artificial cow's, formula.....	410
carbonated, use in dyspepsia, etc.....	400
cow's, contains citric acid.....	513
wine, see Kefir and Koumiss.	
Millard, E. J. Influence of saccharin upon action of ferments.....	26
Millian, M. Methods for proving presence of cotton oil in olive oil.....	290
Mistura, Philadelphia Hospital.....	316, 317, 371, 372
Mixture adhesive, for leather and metal.....	452
emulsifying, Nicot's, formula.....	448
explosive, proper procedure.....	455
serious accident.....	479
for removal of warts.....	615
terpin, Chéron.....	614
Mixtures alcohol, danger of use in ear.....	511
freezing, containing carbonic anhydride.....	582
Moerk, F. A. Bismuth subnitrate.....	445
Formic acid, detection and estimation in acetic acid and acetates..	131
Gleanings from German Journals.....	399, 451, 513, 555, 610
Mercurammonium chlorides.....	80, 109
Oxy salts of bismuth.....	385
Molva vulgaris, acidity of oil.....	614
Momordica operculata, botanical relation of.....	335
Monochloracetone, preparation and properties.....	31
Moody, Thomas F. Assay of benzoin.....	606
Morchella esculenta contains helvellic acid.....	139
Morphine habit, remedy for, (castor).....	177
phthalate, properties and uses of.....	102, 249
test for, sugar and sulphuric acid.....	247
water of crystallization.....	566
Mosquito bites, remedy for, (chloroform).....	177
Mould, prevention in solutions of gum.....	408
Mouth wash, iodotannin.....	614
Mucilage, moss, as emulsifiers.....	170
Mucilago acaciæ, rendered permanent.....	9
Muir M. P. and S. B. Gott. Bismuth iodide.....	253
Muller, M. Action of water on lead.....	250
Mumma, F. G. Preparations of calendula.....	609
Musk, gazelle's, used in Algeria.....	348
Myrrh, secretion of.....	506
Naphthalin in insect powder.....	108

Naphthol, α and β , antiseptic and toxic properties of.....	119
β , purification for medicinal use.....	177
camphorated, properties.....	510
detection of.....	513
solution for external use.....	276
Narceine, relationship to naphthalin.....	556
Narcotine, relation to hydrastine.....	634
Naringin, decomposition by acids.....	287
National Formulary, completion of.....	320, 382
Naudain, E. H. Liquor hydrargyri chloridi corrosivi.....	174
Nickel, action of phosphates on.....	619
baths for plating, preparation.....	141
salts, innocuousness.....	181
Nomenclature, pharmacopœial, for labels.....	535
suggestions for pharmaceutical preparations.....	527
Nylander's test for sugar.....	452
●atflour in treatment of burns.....	27
Obituary.—Biddle, Wm.....	155
Bodley, Rachel L.....	384
Boileau, W. N. K.....	272
Brown, J. T.....	272
Davis, R. C.....	544
DeBary, H. A.....	157
Durell, K.....	272
Gray, Asa.....	110, 157
Kemble, J.....	544
Luhn, G. J.....	320
Méhu, C. J. M.....	158
Moore, J. F.....	159
Oppermann, J. W. H.....	272
Pfund, H. L.....	544
Planchon, J. E.....	272
Pritchett, H. H.....	320
Proctor, R. A.....	544
Rieckher, Th.....	157
Robbins, D. C.....	272
Roberts, Jos.....	110, 159
Ronnefeld, T.....	384
Savery, J. C.....	544
Scott, T. J.....	544
Tatem, A.....	320
Vincent, L. S.....	384
Weigner, J. A.....	320
Zentmayer, J.....	224
Oil asarum canadense, constituents of.....	236
europæum, composition of.....	236
buchu, camphor of.....	624
cajuput, characters of.....	536
composition of.....	454
carron, Phila. Hosp.....	372
chenopodium, emulsion.....	546
cloves, specific gravity and tests.....	448
cod liver, adulteration with mineral oil.....	244
alkaloids of.....	511
free acids in.....	613
new constituent in.....	570
substitute for lipanin.....	243, 410, 586
corn, (maize) manufacture and use.....	325
cotton seed, detection of, in lard.....	573
presence in olive oil.....	290
reaction of (lead acetate and ammonia).....	13
used for adulterating lard.....	597
eucalyptus globulus, yield of.....	401
healing, (calendula).....	609
hedeoma pulegioides, analysis of.....	161
linseed, adulterated with mineral oil.....	319
copper in.....	109
solubility in alcohol.....	109
liver, new constituent.....	570
maize, production and use.....	325
margosa, origin and composition of.....	629
mentha arvensis, characters of.....	639
monarda punctata, analysis of.....	133, 140

Oil, mustard, contains carbon disulphide.....	556
myrcia, specific gravity and test.....	441
olive, production in California.....	125
testing, for cotton seed oil.....	290
testing for sesame.....	238, 290
panicum, production.....	139
patchouli, adulteration of.....	184
peppermint, manufacture of.....	328
polarizing power.....	527
pimenta, specific gravity and tests.....	443
sandalwood, of India and Fiji, characters of.....	182
sesame, test for (sugar + HCl).....	238, 290
theobroma, composition of.....	610
turpentine, physiological action.....	108
Oils, volatile, estimation of alcohol in.....	613
formation of.....	505
still for.....	529
Ointment, Russian chilblain, formula.....	245
see also Unguentum	
Olea ætherea sine terpeno.....	451
Oleoresina aspidii, commercial, solubility of.....	230
Oleum cinereum, formula.....	512
benzoatum, formula.....	560
lini et calcis, Phila. Hosp.....	372
roseæ, yield of.....	347
Olive culture in California.....	124
Oomra whatti, East Indian gum.....	302
Opium, morphimetric assay of.....	539
production in Australia.....	45
Orchis species, secretion of mucilage.....	505
Ouvard, L. Action of alkaline phosphates on oxides.....	617
Oxides, action of alkaline phosphates on.....	617
Oxytropis Lamberti, a loco weed.....	528
<i>Painter, H. T.</i> Preparations of <i>Pycnanthemum linifolium</i>	610
<i>Palen, J. A.</i> <i>Rhus glabra</i>	389
Pancreatin, influence of saccharin upon action of.....	26
Panicol from millet seed.....	139
Papain, influence of saccharin upon action of.....	27
Paper making, ancient materials.....	298
Paper, test, for urine.....	616
test, of flowers and berries.....	598, 600
Paracet-phenetidin, action of.....	240
Paradise grains, detection in pepper.....	403
Paris green, commercial, purity of.....	379
<i>Partee, Wm. A.</i> Analysis of poke root.....	123
Pasta Mack, a toilet preparation, composition of.....	245
Paste, odontalgic, formula.....	409
starch, permanent.....	560
Pastilles, antiseptic, for diphtheria.....	610
iodine, preparation.....	246
of saccharin, formula.....	181
Patchouli, adulteration of, with other plants.....	184
<i>Patton, J. G.</i> Commercial petrolatum.....	11
Pavesi's cosmetic, formula for.....	616
Pediculi pubis, application.....	510
<i>Pellacani, Dr.</i> Detection of alkaloids after death.....	569
Pencils, caustic, preparation.....	583
urethral, preparation.....	409
Pentachloracetone, preparation and properties.....	36
Pentenes, characters of.....	307

Pepper and its adulterants.....	354
commercial, analysis for adulteration.....	481
detection of paradise grains in.....	403
Peppermint plants, treatment and distillation.....	328
Pepsin, comparative testing of (Thompson).....	529
influence of saccharin upon action of.....	26
tests, relative value.....	464, 468
Peptone, by chemical reaction.....	99
in urine, Tanret's reagent.....	405
production and test of.....	514
Peptones, koumiss, preparation.....	147
Pereirine hydrochlorate, a substitute for quinine.....	76
Petrolatum, antiseptic, Brondel's formula.....	180
commercial, examination.....	11
Petroleum, origin of.....	187, 478
Pharbitis Nil, purgative properties of.....	580
triloba, as a source of jalap.....	580
Pharmaceutical Congress at Barcelona.....	381
seventh international.....	269
Society of Australasia.....	218
Pharmacists and physicians, relations between.....	220
registered as physicians.....	379
Pharmacopoeia of Philadelphia Hospital.....	313, 371, 423
revision of.....	319
Pharmacy and medicine at international exhibition in Brussels.....	150
section of, in medical associations.....	65, 221, 378
Phenacetine, action of.....	240
detection of acetanilid in.....	403
Philadelphia College of Pharmacy	
Alumni Association.....	219
Class of 1887-1888.....	55
Commencement.....	215
Examinations.....	204
Graduates.....	211
Minutes of meeting.....	202, 477
Pharmaceutical meetings.....	58, 109, 148, 203, 268, 318, 584, 635
Zeta Phi Alpha Chapter.....	220
Phloroglucin, vanillic, Gunzberg's reagent.....	240
Phlox carolina contains solid hydrocarbon.....	321
Phosphates, alkaline, action on oxides.....	617
Phosphorus, against phylloxera.....	404
Photosantonin, action of.....	260
Photoxylin, preparation and use of.....	235, 268
Physicians and pharmacists, relations between.....	220
Physostigma, eseridine in.....	611
Pichi, alkaloid and fluorescent principle in.....	12
Pilea pumila, analysis of.....	390
Pills, agaricin, use in night sweats.....	408
Blaud's preparation (England).....	173, 204
cacao-coated, preparation.....	138
creolin, formula.....	568
iron, commercial, quality of.....	183
phosphorus, preparation with chloroform.....	176
terpinol, formula, Tanret.....	12
Pilula, Philadelphia Hospital.....	372, 378
Pinene, characters of.....	308
Pingrass as bee feed.....	127
Piperine estimations.....	513
Plant lice, preparation for destroying.....	176
life, effects of chemicals upon.....	48
Plants, medicinal, of Algeria.....	347

Electranthus sold in place of patchouli.....	187
Pogostemon Patchouli, uncertain supply of.....	184
Poisons, general antidote for.....	246
neutralization of.....	345
Poke root, analysis of.....	123
Poppenhusen, H. A. C. Apocynum cannabinum.....	168
Potassium bichromate in glue.....	289
bitartrate, commercial, impurities in.....	379
limit tests for calcium tartrate.....	530
chlorate, incompatibility with iodide of iron.....	404
cyanide, incompatible with chloral.....	286
iodide, commercial, quality of.....	279
influence upon elimination of mercury.....	146
test for nitrate in.....	612
tests for sulphite in.....	242
permanganate, rate of oxidation of carbon compounds.....	255
Potentilla canadensis, medicinal use.....	836
Powder, insect, improved formula, (naphthalin).....	163
Prebble, J. G. Notes on East Indian gums.....	457
Precipitate, white, preparation and chemistry of.....	80, 109
Prescriptions, notes of incompatibilities.....	351
Preservatives, effect on action of diastase.....	356
Puchot, E. Aldehyde resin.....	29
Pulveres, Philadelphia Hospital.....	373, 423
Pus, reagent for, tincture of guaiac.....	451
Pycnanthemum linifolium, preparations of.....	610
Pyridine, assay of.....	405
origin and medical uses of.....	418
use in asthma.....	108
Pyruvin from citric acid and glycerin.....	14
Quackenbush, F. B. Fluid extract of yerba santa.....	74
Quassia, for destroying plant lice.....	176
Quebracho, and its alkaloids, toxic properties of.....	140
Quinine, masking taste of.....	527
hydrochlorate, systematic examination of.....	411
sulphate, cause of reduction in price.....	428
systematic examination of.....	411
tannate, tasteless, formula.....	515
Quinoline, tartrate and salicylate, for surgical dressing.....	346
Rebennau, J. H. Guaiac resin.....	606
Raja radiata, acidity of oil.....	614
Remedies, notes on some new.....	273
notes on some old.....	336
Remington, Jos. P. Will pharmacists accept?.....	65
Remy's antiseptic solution, formula for.....	178
Reseda luteola, medicinal use.....	337
odorata, uses of.....	337
Resin, aldehyde, characters of.....	29
Resin (colophony) detection of.....	611
spontaneous combustion of powder.....	455
guaiacum, commercial quality of.....	606
Resins, separation of.....	420
Resorcin or resorcin, preparation and uses of.....	362
Resorcin, preventive of seasickness.....	410
Reviews.—Annual of Universal Medical Sciences.....	480
Berthelot, M. Collection des anciens alchimistes grecs.....	222
Birkenwald, P. Beiträge zur Chemie der Sinapis juncea und des Senf- öls.....	432
Brendel, F. Flora Feoriana.....	224

Reviews. —Bruton, T. L. Text-book of pharmacology, therapeutics and materia medica.....	592
Causee, E. De l'aluminium et de ses sels.....	542
Central Experiment Farm, Department of Agriculture.....	155
Christopher, W. S. Chemical experiments for medical students.....	591
Crampton, C. A. Foods and food adulterants.....	383
Cure, A. Contribution à la Photométrie scolaire.....	542
Cutter, E. Partial syllabic lists for clinical morphologies of the blood..	432
Dérue, L. Des principaux camphres d'origine végétale.....	542
De Vrij, J. E. Kinologische Studien.....	383
Dohrmann, E. Beiträge zur Kenntniss des Lycconitins.....	432
Dreuilhe, A. Les menispermées et leurs produits.....	542
Einberg, F. Beiträge zur Kenntniss des Myocotonins.....	154
Engelhardt, R. Beiträge zur Toxicologie des Anilin.....	432
Flückiger, F. A. Pharmaceutische Chemie.....	152
Fortune, H. Des Violariées; étude speciale du genre Viola.....	154
Gautret, J. L'huetre de la Seudre.....	431
Geffroy, E. F. Dosage de l'urée.....	542
Geoffroy, E. Aniline et fuchsine.....	542
Guide-book for distillers and manufacturers of liquors.....	592
Hallberg, C. S. Physician's manual of the National Formulary.....	543
Havard, V. Report on flora of western and southern Texas.....	224
Heebner, C. F. Manual of pharmacy and pharmaceutical chemistry..	153
Henon, M. Des graines étrangères dans le ble et ses produits.....	542
Humphrey, J. Future of pharmacy.....	432
Lautié, H. B. Des algues pharmaceutiques.....	542
Lehn and Fink. Notes on new remedies.....	592
Lomb prize essays.....	271
MacLean, D. Some retrospective and prospective thoughts on surgery	432
Martindale Wm. The extra Pharmacopœia, 5th edit.....	543
Mattison, J. B. Cocaine dosage and cocaine addiction.....	542
Moore, C. W. Water, its impurities gathered from air and earth	431
Newman, Rob. The galvanocautery sound and its application.....	155
Pennsylvania State College, Agricultural Station	271, 432
Prescott, A. B. Organic analysis	111
Proceedings American Pharmaceutical Association.....	111
National Wholesale Druggists' Association	154
Provot, H. Des antipyrétiques de la série aromatique.....	542
Report, Alumni Asso. of Phila. College of Pharm. (24th annual).....	430
Board of State Agricultural Experiment Station (Amherst).....	384
Illinois Board of Pharmacy (6th annual).....	432
of Commissioners of Iowa (4th biennial).....	154
of committee on indexing chemical literature.....	155
of inspector of milk and vinegar.....	383
of managers of Penn. Hospital.....	432
on experiments in treatment of downy mildew and black-rot of grape-vine.....	543
State Board of Health, Mass. (19th annual.).....	384
Ricketts, P. de P. Skeleton notes upon inorganic chemistry	270
Rother, R. Beginnings in pharmacy.....	269
chemistry of pharmacy	590
Rusby, H. H. Coca at home and abroad.....	431
Contributions from herbarium of Columbia College.....	482
Ruschenberger, W. L. W. College of Physicians of Philadelphia	223
Sadtler, S. P. Russian and American petroleum.....	384
Sambuc, C. La flore et la matière médicale de Sénégal.....	542
Sayre, L. E. Loco-weed, Astragalus mollissimus.....	155
Schimmel & Co. Bericht	592
Science of photography at home and abroad	544
Simon W. Manual of chemistry	590
Sugar-producing plants.....	543

Reviews. —Taylor, A. B. Octonary enumeration and its application to weights and measures.....	155
Texas Health Journal.....	384
Todd, A. M. Treatment and distillation of peppermint plants.....	328
Transactions of American Dermatological Association.....	155
Untersuchungen des Inversionproducts der Trehalose	432
Védrines E. Etude sur les eaux minérales du Cantal.....	542
Volksthümliche deutsche Arzneimittelnamen.....	542
Wall, O. A. The prescription variously considered.....	223
West Chester, Pa.....	432
Whelpley, H. M. Chemical lecture notes.....	590
Wilder, H. M. Price and dose labels of drugs and preparations.....	543
Wood, H. C. Therapeutics, principles and practice.....	591
Wood, R. E. Quality of the brain.....	271
Wooten, E. Toilet medicine.....	270
Year-book of Pharmacy.....	111
<i>Rhamnus purshiana</i> , some constituents of bark.....	87, 516
<i>Rhipogonum scandens</i> , use of roots.....	686
<i>Rhus glabra</i> , analysis of leaves.....	389
poisoning, antidote for (richweed).....	390
<i>Ribes floridum</i> , properties of.....	338
nigrum, medicinal use.....	337
<i>Ricinus communis</i> , analysis of.....	98
Ringler, G. P. Mucilage and syrup of acacia.....	9
Ritter, N. G. Commercial lard.....	10
Rieze, B. & A. Bullerow. Asarone.....	304
Robinson, R. Kauri gum industry.....	686
Rosin, detection of.....	611
powdered, spontaneous combustion of.....	455
Rotoine, commercial, substitution for alkaloid.....	236
Rubber goods, composition for repairing.....	512
Rubies, artificial, preparation of.....	289
Rusby, H. H. Cinchona cultivation in Bolivia.....	310
On coca.....	199
On guarana.....	266
The home of the cinchonas.....	142
Sacchara, Philadelphia Hospital.....	423
Saccharin, detection in beer.....	359
in glucose.....	406
influence upon action of ferments.....	26
test for	399
use in elixirs and pastilles.....	100
Saffron, falsification of powdered.....	288
substitutes for coloring matter of.....	288
Safranin, reagent for glucose.....	613
Safrol, characters of.....	309
Salicin, dose of.....	546
Salkowski, Prof. On the antiseptic action of chloroform water	475
Salol, origin and effects of.....	365
Salt, codfish, therapeutic value of.....	99
Salt, table, prevention of deliquescence.....	530
Samuel, A. H. Origin of petroleum.....	187
Sanguinarine, estimation with Mayer's reagent.....	496
Santalum Yasi, yield of volatile oil.....	182
Santonin, physiological action.....	259
solution very active.....	511
Savine, use in cancer.....	551
Schinus Molle, fruit of, character and use.....	339
use in Algeria.....	348
Schmidt, E. and F. Wilhelm. Hydrastine and derivatives.....	633

<i>Schroeter H. J. M.</i> Analysis of bitter wine of iron.....	154
Analysis of volatile oil of <i>Monarda punctata</i>	113
<i>Cassia marilandica</i>	231
Commercial sodium bicarbonate	602, 637
Scopoletin, fluorescent principle of Japanese belladonna.....	235
<i>Scopolia hardnackiana</i> , alkaloid of root.....	236
japonica, choline and mydriatic alkaloids.....	235
Sels de morue, therapeutic value.....	99
<i>Senna</i> , adulterations in.....	459
ash in different varieties.....	460
Shellac, constituents of.....	504
<i>Shepherdia argentea</i> , description, uses and composition of fruit.....	593, 637
<i>Shimoyama, Y.</i> Chemistry of buchu leaves.....	624
Shot, porcelain, for cleaning bottles.....	177
<i>Siegesbeckia orientalis</i> , medicinal use.....	340
<i>Siggins, F. M.</i> Analysis of leaves of <i>Eupatorium purpureum</i>	121
Value of commercial gingers.....	278
Silver chloride, combination with metallic chlorides.....	198
iodide, nascent, use in conjunctivitis.....	407
Sleep, chemistry of.....	101
Smelling salts, English, preparation.....	403
<i>Smith, A. P.</i> Pepsin.....	464
<i>Smith, Howard M.</i> Assay of chocolates.....	277
<i>Snou, H. W.</i> Mayer's reagent for the estimation of alkaloids.....	487
Soap, disinfectant, sulphocarbolate.....	613
mercuric iodide.....	553
Sodium bicarbonate, commercial, purity of.....	602, 637
borate, reaction with glycerin.....	455
use in treatment of diphtheria.....	5
chloride, in migraine.....	180
prevention of deliquescence.....	530
iodide, test for nitrate.....	612
pyrophosphate, for estimation and separation of metals.....	421
salicylate, in toothache.....	403
preservation.....	100
silicofluoride, an antiseptic.....	584
sulphobenzozate, application to wounds.....	136
as an antiseptic dressing.....	244
preparation and use.....	401
<i>Sokoloff, D. A.</i> Action of root of <i>Apocynum cannabinum</i>	581
Solanine compared with antipyrine and acetanilid.....	345
<i>Solanum grandiflorum</i> contains grandiflorine.....	450
Solution of indigo, for writing ink.....	102
bromides, Erlenmayer's.....	611
Remy's antiseptic, preparation of.....	178
Solutions, ferric, action of cold	449, 611
medicinal, sterilization of	510
<i>Soya hispida</i> , analysis and uses of.....	405
Soziodol, constitution and properties.....	239
preparation, properties and uses of.....	621
Sparteine sulphate, action of.....	451
Specific gravity of liquids, easy method (Taylor).....	67, 175
<i>Spiritus ætheris nitrosi</i> , keeping qualities.....	349
<i>Spondias mangifera</i> yields amra gum.....	458
<i>Spring, W. and E. Van Aubel.</i> Action of acids on zinc containing lead.....	20
<i>Squibb, E. R.</i> Notes on antipyretics.....	361
<i>Stachys bulbifera</i> , description and uses of.....	101
Staranise, origin of.....	502
Starch paste, permanent, for analysis.....	560
potato, manufacture in Prince Edward Island.....	598
Starches, commercial, quality of.....	597

State Pharmaceutical Associations.

Alabama.....	375, 588	Michigan.....	588
Arkansas.....	425	Minnesota.....	425
California.....	218, 639	Missouri.....	152, 426
Connecticut.....	322, 427	Nebraska.....	377, 478
Dakota.....	427, 587	New Hampshire.....	152
Delaware.....	375	New Jersey.....	377
Florida.....	425, 427	New York.....	426, 478
Georgia.....	477	North Carolina.....	152
Illinois.....	222, 587	Ohio.....	478, 588
Indiana.....	375	Pennsylvania.....	378, 478
Iowa.....	375	Tennessee.....	427
Kansas.....	376, 478	Texas.....	222, 427, 588
Kentucky.....	376, 588	Virginia.....	380, 427
Louisiana.....	376, 478	West Virginia.....	478
Massachusetts.....	377		
<i>Staudt, A. J.</i> Moss mucilages as emulsifiers.....	170		
<i>Stebbins, J. H. Jr.</i> Relative value of different pepsin tests.....	466		
<i>Stockmann, R.</i> Physiological action of borneol.....	620		
<i>Stratton, C. C.</i> Sugar whitened with blue pigment.....	277		
<i>Streper, F. P.</i> Fluid extract of wild ginger.....	6, 54		
<i>Sroman, A.</i> Crystallized mercurous iodide and bromide.....	197		
Strontium oxide, action of phosphates on.....	618		
Strophanthin, amorphous and crystallized, action and strength of.....	100		
high price of.....	12		
Strophanthus as a diuretic.....	347		
seeds, commercial, different kinds.....	179		
larvæ and insects present in.....	237		
Strophanthus, variable activity of preparations.....	12		
Strychnol, or hydrate of strychnine, preparation.....	564		
Strychnine as a hypnotic.....	355		
estimation with Mayer's reagent.....	496		
Stylophorum diphyllum, alkaloid of.....	562		
Styrax Benzoin, formation of resin in.....	506		
Sugar as an alkaloid reagent.....	247		
commercial, whitened by blue pigment.....	277		
Nylander's test.....	452		
poor quality of.....	109		
Sugars of hesperidin and naringin.....	287		
Sulfonal, preparation and properties.....	274		
Sulphur, new oxygen compound.....	344		
Suppositories, Phila. Hospital.....	424		
Suppositories, glycerin, formula.....	560		
use in constipation.....	409		
Sylvestrene, characters of.....	307		
Syntonin, formation and medical value.....	99		
Syrupi (calc. phosph., casc. sagr., chloral, guaiac., hypophos. c. fer., Phoshat. co., Potas. iod. co., Phil. Hosp.....	424		
Syrups, fruit, preparation.....	448		
sweetened with saccharin.....	406		
Syrupus acaciæ, preparation from mucilage.....	9		
aurantii amari, action of acids and acid salts upon.....	99		
codeinæ, Brit. For.....	518		
dentition, Vigier.....	615		
ferri bromidi, Brit. For.....	518		
et quiniæ hydrobromatum, Brit. For.....	518		
hypophosphitis, Brit. For.....	518		
iodidi, French Codex.....	449		
permanent (England).....	547, 585		
phosphatis, preparation (Wright).....	558		
quiniæ et strychninæ hydrobromatum, Brit. For.....	518		
hypophosphitum comp., Brit., For.....	519		
commercial, deficient.....	539		

Syrupus ipecacuanhæ aceticus , Brit. For.....	519
<i>lactucarii</i> , formulas and preparation (Beringer).....	70
<i>pruni virginianæ</i> , Brit. For.....	519
<i>pycnanthemi</i> , preparation	610
<i>saccharini</i> , formula.....	181
<i>sarsaparillæ compositus</i> , preparation (Brandt)	9
<i>scillæ compositus</i> , process of preparation (Brandt).....	10
Syzygium Jambolanum , analysis of.....	368
medicinal use.....	339
Tanret's reagent for albumin etc.	405
Tartar emetic , commercial, purity of.....	135
Taylor, A. B. An easy method of finding the specific gravity of liquids.....	67
Specific gravity	175
Tea , a new base in.....	461
Terebinthina and derivatives, relative value of.....	12
Terpenes and their derivatives.....	307
Terpin , characters of.....	309
mixture for bronchitis.....	614
Test paper , dahlia, elderberry, georgina.....	600
iris.....	598
mallow.....	600
papers for urine.....	616
Tetrachloracetones , preparation and properties	35
Thallin , origin and medical use of.....	364
Theophylline , alkaloid from tea.....	462
Thio-reorcin , substitute for iodoform.....	400
Thomson, I. W., and W. Duncan. On acetic extract of ipecacuanha.....	264
Thudichum, J. L. W. Alkaloids in human urine.....	567
Thuja , formation of resin in.....	506
Thymol from oil of monarda.....	120
Tinctura calendulæ florum , Brit. For.....	519
from flowers and leaves, properties of.....	609
<i>capsici fortior</i> , Brit. For.....	519
<i>castorei</i> , remedy against the opium habit.....	177
<i>euonymi</i> , Brit. For.....	519
<i>guaiaci</i> , sensitive reagent for pus.....	451
<i>ipecacuanhæ et opii</i> , modification of formula.....	226
<i>phosphori composita</i> , Brit. For.....	520
<i>quillaiæ saponariæ</i> , menstruum and strength.....	16
<i>strophanti</i> , preparation.....	318
<i>vanillæ</i> , proposed changes in preparation (Faust).....	9
<i>zingiberis</i> in grocery stores.....	637
Toilet cream of lanolin	562
Tooth paste , cocaine, etc.....	409
Tooth powder , salol, formula.....	409
Tornadoes , prize studies of.....	383
Travis, J. W. Isinglass.....	609
Trichloracetones , preparation and properties.....	34
Trimble, H. Bitter principle of burdock fruit	79
catechu and gambier.....	497
composition of precipitated ferrous sulphate.....	485
Some Indian food plants. <i>Shepherdia argentea</i>	593
Trimble, Henry and Helen C. De S. Abbott. Solid hydrocarbons in plants.....	321
Trimethylamine hydrochlorate , dispensing note.....	19
Turpentine , value of derivatives of.....	12
Udransky, L. , furfuraldehyde color reaction.....	506
urinary pigments.....	28
Unguenta see also ointment	
(alb., Acid carbol., Hydrar. amm., Hydrar. nit. dil., Mauri, Peruv., Zinci ox. carbol.) Philadelphia Hospital.....	425
Unguentum antineuralgicum , menthol and chloral.....	401
boroglycerinatum, formula.....	556

Unguentum calcii chloridi, formula.....	583
hydrargyri, commercial, amount of mercury in.....	10
rapid preparation with sodium.....	344
hydrargyri oxidi flavi, with paraffin.....	538
oleoresinae capsici, British Formulary.....	520
University of Pennsylvania, fire at.....	320
Urena lobata, adulteration of patchouli.....	185
Urine, human, alkaloids in.....	567
pigments, investigation of, (Udransky).....	28
Tanret's reagent for albumin, &c.....	405
test papers for.....	616
Ustilago maydis, action and uses of.....	51
Van Aubel, E. and W. Spring. Action of acids on zinc containing lead.....	20
Van Swieten's liquor.....	175
Vanillin in Lupinus albus.....	237
use of, as a reagent.....	240
Varnish, color-changing, composition and application.....	243
Veratrine, test for, sugar and sulphuric acid.....	247
Vernonia nigritiana contains vernonin.....	347
Vicia Faba, use of flowers.....	404
Vinum (see Wine)	
Vortmann, G. Estimation and separation of metals by sodium pyrophosphate.....	421
Wakeman, A. J. Solubility of magnesium ammonium phosphate.....	583
Warden, C. J. H. Margosa oil.....	629
Warts, use of arsenic for.....	595
Water, action on lead.....	250
detection of nitrous acid in.....	611
purified by heat.....	562
rose, irritating precipitates.....	558
(see also Aqua)	
Waters, mineral, artificial and natural.....	528
Wax, bees, detection of adulterations in.....	561
of ceresin in.....	402
of rosin in.....	611
cay cay, preparation and use of.....	449
fumigating, formula.....	178
Japan, composition of.....	614
Webber, J. Le R. and H. F. Meier. Examination of cascara sagrada.....	87
Weiser, F. R. Pilea pumila.....	390
Wilhelm, F. and E. Schmidt. Hydrastine and derivatives.....	633
Williams, Wm. J. Hydrargyrum ammoniatum.....	279
Wine cinchona, preparation and dose.....	338
ipecacuanha, critical examination of process.....	299
of iron, bitter, analysis of.....	154
Xanthine in tea.....	462
Zinc, action of phosphates on.....	619
containing lead, action of acids.....	20
dust as reducing agent for ferric salts.....	291
oxide, commercial quality of.....	606
phosphide, administration and dose.....	140
sulphate, dangerous acidity.....	344

4255-26 ERRATA.

- Page 93, foot note, line 2, for 1885 read 1855.
 110, line 12 from bottom, for American College read Maryland College.
 242, line 20 from top, for hydrogen read Hg.
 402, line 3 from top, for a solution read evolution.
 408, line 10 from bottom, for carbonate read carbamate.
 562, line 15 from top, for aridium read sodium.

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